Humaniculture

Hubert Higgins

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BY

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CHAPTER I

INTRODUCTORY

THERE are few civilised communities that are not seriously and earnestly concerning themselves with the causes of the terrible phenomena of degeneration that are so prominent a feature of modern city populations. In an undefined and vague way the old illogical reasonings no longer suffice to quiet our consciences; less superficial causes and more effective remedies are being eagerly sought for, not only by philanthropists, but by politicians and administrators.

The explanations of such phenomena can be said to divide themselves into two opposite points of view: the superstitious, metaphysical, pseudo-scientific, passive, or pessimistic school; and the active, progressive, scientific, or optimistic school.

The pessimistic point of view is as old as the history of the world. It has a significant expression in the words attributed to Buddha: "From the soles of the feet to the head, he saw that the body was born in impurity, proceeded from impurity, and was always turning to impurity. Who is the wise man who having understood this does not look on his body as an enemy?" This uncompromising and awful conception of human nature, born of the despair of Oriental passivity and despotism, has had in its varied expressions only too real an influence, not only on thought, but on action and the general conditions of life. Lecky, in his "History of European Morals," gives a striking picture of its influence: "The conviction that human nature was essentially corrupt led to a struggle against it; all pleasures were forbidden; even the most innocent were looked on as vicious. What a complete contrast to the calm and joyous conception that characterised Greek philosophy, in which there was no idea of

a struggle with the supposed corruption and imperfection of man. This dual theory of man's nature became so extreme that its proselytes, so concerned for the salvation of their souls, descended, from the physical point of view, to the level of savage beasts. Hermits lived in animals' caverns. They gave up clothes and wandered about naked, covered with long unkempt hair. In Mesopotamia and in a part of Syria, a sect was formed; they had no houses, and ate neither bread nor vegetables, but wandered in the mountains and nourished themselves on herbs. Cleanliness was looked on as a sign of corruption of the soul; among the most esteemed saints were those who gave no care to their bodies." These views have had many new dresses. Their latest scientific expression may be said to be found in Professor Metchnikoff's book "Human Nature," in many kindred writings, and in the influence they exert on modern thought and action, especially on questions of crime, degeneration, and pauperism.

The actions of the pessimistic school of thought can be said to be guided more by speculation than by induction or measurement. The horrors practised under the *lex talionis*, parental, theocratic, and political autocracy and tyranny, the repressive and cramping educational systems of Europe, all derive their philosophical support from some variant or other of the dual theory of man's nature; in other words, of its essential evil.

The opposing school of thought is concerned with research and experiment, under widely different auspices, which, at any rate, have the common characteristic of "doing things," rather than merely "thinking things." The late Dr. Barnardo of London has gone far to disprove the inevitableness of the transmission of criminal and thriftless characteristics from parents to offspring, and also Dr. Kellogg of Battle Creek, Michigan, has been successful in this work. Mr. Z. R. Brockway of Elmira, New York, showed that no less than ninety per cent of the crimi-

nals treated by his regenerative methods could be restored to society as useful citizens. The Elmira demonstration was begun, curiously enough, in 1876, in the same year that Professor Lombroso wrote "L' Uomo Delinquente," and startled the world with his theories of hereditary crime and atavism. The work done in America has gone far to disprove the current theories of heredity. Professor Lombroso created the science of criminology; Mr. Brockway, its therapeutics. Thus both have rendered inestimable service to humanity. General Booth has regenerated many paupers and criminals in three continents by Salvation Army methods, and has shown the way for governments to follow in his footsteps. The Church Army of Great Britain has also done good regeneration work. These models are being studied by governmental boards with the idea of reforming degenerates on practical scientific lines.

The ideals that directed the noble accomplishment of Greek civilisation showed

triumphantly a glorious example of national humaniculture, which has only to be imitated and excelled by the aid of the greater resources of modern civilisation and science. These examples, together with the private specialised experiments of Messrs. Patterson, Kellogg, Cadbury, Lever, Heinze, Nelson, Van Marken, and many others, illustrate the successful achievement which has always rewarded efforts that aimed at the amelioration or the prevention of human disorganisation.

This book is written with the object of showing that there are good grounds for the belief that a more thorough understanding and a more complete use of the human aptitudes provide the essential foundation for scientific humaniculture. To illustrate a point of view from which human nature may be profitably considered, let us take the case of a new-born child. An infant is born with three sets of qualities :

(1) Those physical and mental attributes that are common to all human beings. The excellence of such a child

will depend on whether it possesses these essential common attributes in the fullest possible degree.

(2) Characteristics that it possesses in common with certain groups of people, such as races and families.

(3) Qualities that distinguish the individual.

The child is exposed throughout life to two sets of conditions:

(1) Adverse conditions, that contribute in a greater or less degree to deterioration and degeneration. Certain of these conditions are inevitable, as in the case of climate; the vast majority, however, are evitable.

(2) Progressive conditions, that contribute to the most perfect development of the child.

It will be obvious that the more favourable and the fewer adverse conditions there are to which the child is exposed, the higher will be the degree of its development towards becoming a perfect human being.

It is only too clear that not only have

we not yet thoroughly realised and studied the fundamental aptitudes and characteristics of human beings, but we have, in the confusion of evidence, contracted curiously diverse and even opposite opinions of the nature and value of the conditions to which children and adolescents are accidentally or deliberately exposed. It will be shown, *inter alia*, in the following chapters that Mr. Horace Fletcher's discovery of the text-book error relative to the optimum nitrogen supply for active, healthy manhood, and its confirmation by Professor Chittenden,[1] have proved our former views on such subjects to be incomplete, unsound, and unscientific. Further research should bring out yet more facts which will enable the sane influence of positive science to replace the present haphazard and ineffective points of view, which are so largely responsible for the deplorable degenerated products of civilisation.

[1] Physiological Economy in Nutrition. Russell H. Chittenden. The Frederick A. Stokes Co., New York; William Heinemann, London.

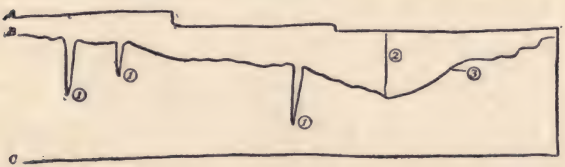
In order to illustrate the nature of the deficiencies of human equipment in some respects, it is profitable to compare the condition of the young of certain of the wild animals with those of civilised human beings. In those admirable books, "Wild Animals I have Known," and "The Lives of the Hunted," Thompson-Seton has given a remarkable account of some of the conditions under which young animals in the wild or native state are reared. They receive from their parents the most careful instruction by precept and example in (1) the food they should eat, and how to obtain it; (2) methods that enable them to escape from their enemies. The importance of this instruction is such that if they fail to carry it out thoroughly they die, either from want of food or from inability to escape their enemies. In the case of the young of human beings, the penalties of exposure to avoidable adverse conditions is by no means certain death, as in the case of the wild animals, but frequently degeneration and inefficiency.

Few people will be found to deny that, provided a child started fair, and was instructed as carefully and as thoroughly as the young of some of the wild animals are known to be, it would tend to develop into a more perfect adult than is now the average result.

It has been necessary to do something towards giving an answer to that very difficult and important question, What is health? For convenience of description the term "optimum health" has been used in a somewhat arbitrary sense to express the highest possible degree of physical efficiency that an individual can attain. It will be obvious that when there are hereditary deficiencies or injuries from accident or disease, there will be a lower degree of optimum health than in the case of more fortunate individuals. In defining health, to say that it is a perfect performance of all the functions of all the organs, is only to ask the same question in another way, as we do not know all the functions of all the organs. If one says

again that health is attained and maintained by obeying the laws of nature, it is merely putting another unsolved question: What are the laws of nature? In the course of wide reading the best description of optimum health was found in one of the sacred writings of the East, in the 13th verse of the second Adhyâya: "The first results of Yoga they call lightness, healthiness, peace, a good complexion, beauty and grace, profuse fragrance, a melodious voice, and light excretions."

One of the essentials of *humaniculture* is to attain and maintain optimum health; when deviations occur, they can be dealt with by two methods, which can be expressed diagrammatically.



A. Line of the optimum health.
B. Line of actual, average health (chronic deviation).
C. Line of death.
1, 1, 1, Illnesses (acute deviations and alleviations).
2. Measurement of the deviation from the optimum.
3. Line of regeneration.

The distance at any time between the line of average life *B* and that of optimum health *A* can be called *Deviation from the Optimum.* There is on the "*B*" line the continual and progressive decline, assisted by the acute deviations caused by illnesses.

When the aim is merely to restore the individual to the level of chronic decline from the depth of an acute deviation due to illness, the process is called *Alleviation;* when it is attempted to reach and maintain optimum health, the process is called *Regeneration.*

(1) *Scientific Humaniculture.* This plan should have its basis in the positive knowledge of human qualities and aptitudes. It should then concern itself with the nature and effects of the adverse conditions to life, and their avoidance. Finally, it should aim to discover and make the fullest possible use of the most favourable means of a progressive and harmonious development. This science should begin its operations even before birth, and it should cease only at death.

Its aim would be to cultivate life not merely for the sake of living, but for the most efficient exercise and the highest development of all the human attributes. It is as boundless as the perfectibility of the human race. By pursuit of such methods as these the Greeks produced more great and learned men, more nearly-perfect human beings, than any other race has ever done, and this in spite of not possessing many of the advantages of modern civilisation, such as the present powerful and speedy means of locomotion, the almost instantaneous transmission of ideas, and the consequent extended opportunities of co-operative social progress. In these days of improved facilities, if concerted and co-operative humaniculture as practised by the ancient Greeks were tried, it would proceed at lightning speed compared with what was accomplished even in the Golden Period of Greece. We have more knowledge, more trained observers, and far greater opportunities; yet at the present day it is easy to show that

there is little or no attempt to organise humaniculture on a scientific basis.

(2) *Regeneration.* This process consists in the methods of restoring and maintaining optimum health. It is obvious that complete regeneration cannot be carried out till we not only understand man's aptitudes, but have experience in their use and development. Since there is neither scientific cognisance nor accurate measurement of health, regeneration under present conditions is most difficult of realisation.

(3) *Alleviation.* The medical sciences owe their development mainly to the necessity for the alleviation of disease. The constant chronic deviation from optimum health, and the acute and more temporary deviations due to illnesses, result from the concurrence of factors that are never repeated in two individuals, or in the same individual at different times. This is because the chronic deviation is the result of environments that are continually changing, and hence must differ in each case. Consequently the resulting

reactions or pathological changes must always differ in character or in degree. In the case of individuals who have not subjected themselves to the more similar conditions of a scientific adaptation to the common environment, there is necessarily an almost infinite possibility of variation. This view would account for the great variations, not only in the number of diseases, but in the differences found in cases with similar diseases; it may be said that no one case resembles another. It would not be difficult to show that if sufficiently similar individuals were exposed to the same unfavourable factors, the same illness would invariably be produced. The way in which the medical profession has successfully dealt with the infinitely variable pathological conditions which constantly-changing environment has produced is one of the greatest triumphs of the human intellect.

Not so long ago disease was a mysterious, vague something-or-other. It was considered to be either a punishment for

sin, or entirely the result of heredity. At any rate, its origin and progress were thought to be inevitable. Gradually, as the principles of causation have become defined, it is seen that disease is a definite, positive result of the aggregation of certain evitable causes. The whole of modern effort is now definitely directed to the investigation of these formerly-mysterious causes. Bacteriology has accounted for a number of the most dangerous and sudden human inflictions. At present there seem to be indications that the root-evil, or, more accurately, that the growth of the trunk of the tree of diseases, is due to the unscientific adaptation of man to his environment, probably during the whole of his life. It is demonstrated that the poisonous products of the growth of micro-organisms, in their reactions on the tissues, cause diseases varying in intensity with the physical condition, or the power of the defensive apparatus of the body. This power of resistance depends on the degree of the deviation from the opti-

mum of health found in the individual. Disease can be said to owe its symptoms to the resultant of the best the body can do to prevent death, or, in other words, to diminish the effects of harmful environment.[1] During these conditions of devia-

[1] "The prevailing idea of disease is of a something that is woful and malignant, evil in origin, evil in intent, evil in effect. The method of its entering into the lives of men would seem to belong to the time

> 'Of man's first disobedience and the fruit
> Of that forbidden tree, whose mortal taste
> Brought death into the world, and all our woe.'

"The popular view claims that disease is a calamity, that its end is destruction, and that it is purposeless except in the direction of doing harm. Popular terms bear testimony to the prevailing of this belief. Man is said to be struck down by disease as by an avenging angel, it seizes upon him as does a roaring lion, it consumes him as does a fire. The attitude of the medical man towards disease is that of an opponent to deadly influences. He has to combat an enemy to mankind whose every movement is dark and malicious. There is no symptom of disease that is not believed to be noxious, and as such must be stamped out with relentless determination. If the patient be sick, the sickness must be stayed; if he cough, the cough must cease; if he fail to take food, he must be made to eat. And why? Because these are manifestations of disease, and are therefore of ill intent and need to be banished.

"I shall hope to show — so far, at least, as the examples

tion from the optimum, life is inefficient in varying degrees, and performance is not equal to intentions. The ruling power, the brain, is undermined, and it then interferes with the healthy adaptations of the body, hurrying it down the road to ultimate ruin by means of neurasthenia, hysteria, etc.

The ideas here set forth had their origin in a study by the author of the practical attempts of Mr. Horace Fletcher to restore his impaired health and declining efficiency, and they have developed in the personal experience which has continued since the

I shall select are concerned — that there is nothing preternatural in disease, that its phenomena or symptoms are marked by a purpose, and that that purpose is beneficent. I shall hope in these examples to demonstrate that the processes of disease are aimed not at the destruction of life, but at the saving of it, and that its manifestations are the outcome of a natural effort towards cure.

"Disease, as popularly realised, is not one of the ills that flesh is heir to, but one of the good gifts, for its motive is benevolent and protective." — From an address on "A Conception of Disease," by Sir Frederick Treves, G. C. V. O. C. B., LL. D., Sergeant Surgeon to his Majesty the King. Delivered to the Philosophical Institution of Edinburgh in November, 1905.

year 1901. Mr. Fletcher had had an American training of quite a varied nature, including marine, country, and city experiences, which had been tested all over the world, and which ensured his having, at the outset of his inquiry into the root-causes of his disabilities, a thorough conception of the practical philosophy of the man of action. He tried, and succeeded. The amount of faith and indomitable perseverance summed up in these few words will never be known even by his friends. Such things are done and forgotten in the joys of success and in the satisfaction created by the hard work for general human interests such as he has subsequently undertaken.

The story of the gradual growth and definition of the ideas that have become so closely associated with his name are best given by Mr. Fletcher himself. I have heard him sum up his conclusions as to foods and feeding by saying: "If you eat only when you have an earned appetite, masticate your food thoroughly,

and take great care to eat only what appetite approves, the rest will take care of itself." This language is simple and direct; and, like many a great truth, it is easily stated, but cannot be adequately understood except through personal experience of the multiple benefits growing out of its acceptance and adoption. It involves a vast amount of understanding through demonstration, and elucidation through actual trial, in a world where unscientific adaptation has made humanity the prey of thousands of suggestions and opinions that are inseparable from incomplete knowledge and incomplete performance, and which result in profound inefficiency.

The question, then, that must be asked at the outset of such an inquiry as this is, "What are the aptitudes and capabilities possessed by human beings?" The mere asking of the question is a long step in advance.

This is the first stage of humaniculture; which, it will be shown later on, is not yet

attained nor even intelligently aimed at by organised science. It would not be of much use now to go beyond the facts that are agreed upon by science at present, and discuss a future development of humaniculture with its dazzling hopes and possibilities. Let us, by means of careful research and observation, ascertain the fundamental basic factors necessary to a logically complete structure.

Spencer and other philosophers realised that the goal of man was the harmonious development of all his qualities and aptitudes. Our development at present is not harmonious: it is fundamentally deficient, more or less blundering and aimless. It is so because, — simply and solely because, — as Comte pointed out in the case of the world in general, there is insufficient positive knowledge of basic qualities and aptitudes. Far more is thought of the shadow, — the superficial and unimportant differences between people, — than is thought of the substance, — the points of human resemblances. We con-

tent ourselves with well-thumbed and even disproved and worn-out formulas, in ancient or modern forms, and alike with scientific and unscientific methods and material. Spencer dreamt, in the cramped life of his boarding-house environment, amidst the troubles of his healthless life, "of the harmonious development of all men's organs in all their functions." Newton, too, thought that the philosophy of nature, developed by the experimental method, ought to contribute to extend and improve moral philosophy, in giving man clearer ideas of his rights and duties. These are the days in which the old dreams of the progress of humanity are being realised and materialised. Is it, then, so impossible to materialise the ideal of positive and progressive humaniculture?

The following pages are devoted to a suggestion of means for bringing about a realisation of this ideal of humaniculture. The discussion is divided into three parts:

Part I., Chapters 2 to 7. This part deals with a description of certain developments that have originated from the work of Mr. Horace Fletcher on mastication, taste, and appetite. It will, it is hoped, be admitted that the facts submitted by an American business man to the organisations of the medical sciences demand the most careful consideration and thorough investigation at their hands. These contentions are practically to be summed up under the general indictment of an absence of orientation towards humaniculture. The consequences of this faulty orientation and organisation are of a far-reaching and unsuspected importance, inasmuch as the essential duty of science to provide knowledge to enable the population to adapt itself to the rapidly changing conditions of the past fifty years has been neglected.

Part II., Chapters 8 to 10. In order to substantiate such views as those advanced in Part I. it is obvious that it is necessary to give some general

considerations of the history of medical doctrines. In Chapter 9 is an account of the activities and output of the hospitals and laboratories, with points dealing with their effects on modern ideals of humaniculture. Chapter 10 is a brief exposition of the most recent medical doctrines that it is claimed show a tendency to support the opinions advanced in Part I.

Part III., Chapters 11 to 13. They comprise suggestions for the development of an apparatus for the acquisition and distribution of the knowledge that will enable everybody to conduct his life to the best advantage.

Part One

CHAPTER II

INTRODUCTION AND HISTORY OF FLETCHERISM

Biot said, "Nothing is clearer than what was discovered yesterday, and nothing more difficult to see than that which one will find to-morrow." So it has been with the remarkable story of a great physiological discovery, made by one who was not in the physiological sense of the word an expert, but whose passport to the attention of the organisations of science has been solely that of success. The main element of the success of Mr. Horace Fletcher's propaganda has been that he was able to realise a difficult principle. In these days of individualism there is too great a tendency to exaggerate the superficial and insignificant differences between people,

and to neglect the fundamentally important common qualities, — those essentially human aptitudes that we all possess. Now, Mr. Fletcher has had the distinction of making a discovery in aptitudes that are not only human, but actually run through the animal kingdom. The possession of certain nerves, glands, and muscles in the mouth corresponds to a set of physical, chemical, and anatomical distinctive characteristics. It will be the task of science to ascertain as soon as possible how far human beings approximate to what Gegenbaur has called the poltophagic division of the animal kingdom, and how much to the psomophagic or non-masticating division.

Mr. Fletcher realises thoroughly that, as Cicero said, nothing is discovered and perfected at the same time; so he is devoting his efforts to securing the fullest investigation of the claims he has made for the practice of his method. He feels that the real motive power in all such matters is, finally, public opinion, and he has lost

no opportunity of making the essential features of his ideas as public as possible.

His story is interesting and inspiring. Some years ago he found himself at that stage of life where, after hard work in all quarters of the globe, he was in a position to retire from active business and devote himself to enjoyment. He had occasion to make an application for life insurance and was refused. This was not encouraging or agreeable at this stage of his life. His symptoms were obesity, shortness of breath, dyspepsia, loss of elasticity and keenness; in short, all those troubles that we are accustomed to associate with the failing health of so-called "advancing age," but which would be more rightly named "advancing death." He consulted medical men in both America and Europe, and had the usual consolations that are administered under such circumstances, with, it is to be feared, the not uncommon result of leaving things much as they were. He then decided in a practical business way to undertake his

own regeneration. He happened at this time to be occupied with some business which necessitated a good deal of tedious waiting at Chicago in midsummer when most of his acquaintances were absent from the city, and to help to spin out the day he used to get through his meals as slowly and deliberately as he could. He noticed a very curious effect from this: hunger was less frequent, he ate less, his weight decreased, and his health became decidedly improved. He then and there made up his mind to experiment in this direction, with the result that in course of time he entirely recovered his health. He then tried to get an explanation from experts, but found none. It is well worth while to reflect what this persistence, that is so easily written about, really entailed. There was literally no one to help him. His friends — well, most of us know how useful friends have always been under such circumstances. One of them begins with a well-meaning attack of chaff, "so as to laugh him out

of his fad," and then when he sees he has failed to do this the anxious friend goes round in the community, shakes his head, and pronounces poor old So-and-So's case to be hopeless, often adding, "Such a good chap, too, it is rough luck on him." All sorts of explanations are made to account for him. Members of his family and old friends recall his youthful escapades, and remember that there is something about him that resembles the eccentricities of a remote ancestor, which explains things to their satisfaction. In short, such an uncomfortable atmosphere is created that it makes a wise man pack up and travel, if he is free to do so. Mr. Fletcher went through all this sort of thing, at the same time acquiring a unique experience in trying to make people understand what he had found out.

After his recovery he tried the insurance companies again, and, although he had to contend against the previous unfavourable verdict, they said that they would gladly

take him at ordinary rates. This is very good evidence of recovery; life insurance experts know their business well and rarely change their verdict about a life-risk.

In the attempts that Mr. Fletcher made to obtain a hearing for his discovery, he found his greatest difficulty with the scepticism of the medical profession. His first convert was Dr. Van Someren of Venice, who not only listened to what he had to say, but has continued to give his time and energies to studying and spreading the new ideals. Dr. Van Someren read a paper at the meeting of the British Medical Association in 1901. Here he attracted the attention of Professor Sir Michael Foster. The matter was brought forward again at the International Congress at Turin in the same year. Sir Michael Foster then showed his interest by inviting Mr. Fletcher and Dr. Van Someren to Cambridge, so that their claims should receive scientific investigation. This was destined to be the start of a new era in the work of exhaus-

tive study of human subjects and of propagandism. Mr. Fletcher found that Physiology had a considerable bogy to confront him with, called the Voit standard of nitrogen nutrition. He was told that in order to obtain acceptance of his ideas it was first of all necessary to prove that his own new standard of economy was more nearly the optimum and that the famous Voit standard was wrong. It was obviously true that he and his colleague presented curious and unusual phenomena in the small amount they ate. It was suggested that, perhaps if they went on long enough, there might be one of those lingering but inevitable calls to the beyond in store for them. How many would have persevered in the face of such adverse warnings as these, with every authority against them? And those who warned them most earnestly were some of the highest in the world. There is something about an American when he is face to face with a fact which he wishes to harmonise with other facts, or

to make their inharmonious elements work together for success, that makes him fight until there is no more resistance. Well, Mr. Fletcher believed in the value of his claim, appreciated the importance of the Court of Physiological Authority to which he was appealing for recognition of his claim to a new discovery and had perhaps heard of the success of the importunate widow, so he imitated those well-known tactics and stayed in Cambridge till they got quite used to him, and began to take him more seriously. After six months' waiting they may have thought that he was going to live there, but it looked less and less as if he would die on their hands. Finally, Sir Michael, who had been the original means of the invitation to Cambridge, and who had instituted the investigation under the care of Dr. Hopkins, showed those judicial qualities that distinguish him by drawing up a report of the Cambridge observations. As he is the permanent president of the International

Congress of Physiology, he used this position to induce the most important professors of physiology in the world to sign a document which declared that Mr. Fletcher's work had practically raised the whole question of human nutrition, and that it was advisable that an international laboratory should be founded and an international inquiry inaugurated to carry out investigations on the subject. All these eminent men agreed to act in the capacity of directors of the proposed institute. Here follows Sir Michael Foster's report:

Experiments upon Human Nutrition

"In 1901 Dr. Ernest Van Someren submitted to the British Medical Association, and afterwards to the Congress of Physiologists at Turin, an account of some experiments initiated by Mr. Horace Fletcher. These experiments went to show that the processes of bodily nutrition are very profoundly affected by

the preliminary treatment of the foodstuffs in the mouth, and indicated that great advantages follow from the adoption of certain methods in eating. The essentials of these special methods, stated briefly and without regard to certain important theoretical considerations discussed by Dr. Van Someren, consist of a specially prolonged mastication which is necessarily associated with an insalivation of the foodstuffs much more thorough than is obtained with ordinary habits.

"The results brought to light by the preliminary experimental trials went to show that such treatment of the food has a most important effect upon the economy of the body, involving, in the first place, a very notable reduction in the amount of food — and especially of proteid food — necessary to maintain complete efficiency.

"In the second place this treatment produced, in the experience of its originators, an increase in the subjective and objective well-being of those who practise it, and, as they believe, in their power of resist-

ance to the inroads of disease. These secondary effects may indeed be almost assumed as a corollary of the first mentioned; because there can be little doubt that the ingestion of food — and perhaps especially of proteid food — in excess of what is, under the best conditions, sufficient for maintenance and activity, can only be deleterious to the organism, clogging it with waste products which may at times be of a directly toxic nature.

"In the autumn of 1901 Mr. Fletcher and Dr. Van Someren came to Cambridge with the intention of having the matter more closely inquired into, with the assistance of physiological experts. The matter evoked considerable interest in Cambridge, and observations were made not only upon those more immediately interested, but upon other individuals, some of whom were themselves medical men and trained observers.

"Certain facts were established by these observations, which, however, are to be looked upon as still of a preliminary

nature. The adoption of the habit of thorough insalivation of the food was found in a consensus of opinion to have an immediate and very striking effect upon appetite, making this more discriminating, and leading to the choice of a simple dietary, and in particular reducing the craving for flesh food. The appetite, too, is beyond all question fully satisfied with a dietary considerably less in amount than with ordinary habits is demanded.

"Numerical data were obtained in several cases, but it is not proposed to deal with these in detail here, as they need the supplementary study which will be shortly referred to.

"In two individuals who pushed the method to its limits it was found that complete bodily efficiency was maintained for some weeks upon a dietary which had a total energy value of less than one-half of that usually taken, and comprised little more than one-third of the proteid consumed by the average man.

"It may be doubted if continued effi-

ciency could be maintained with such low values as these, and very prolonged observations would be necessary to establish the facts. But all subjects of the experiments who applied the principles intelligently agreed in finding a very marked reduction in their needs, and experienced an increase in their sense of well-being and an increase in their working powers.

"One fact, fully confirmed by the Cambridge observations, consists in the effect of the special habits described upon the waste products of the bowel. These are greatly reduced in amount, as might be expected; but they are also markedly changed in character, becoming odourless and inoffensive, and assuming a condition which suggests that the intestine is in a healthier and more aseptic condition than is the case under ordinary circumstances.

"Although the experiments hitherto made are, as already stated, only preliminary in nature and limited in scope, they establish beyond all question that a

full and careful study of the matter is urgently called for.

"For this fuller study the Cambridge laboratories do not possess at present either the necessary equipment or the funds to provide it. For the detailed study of the physical efficiency of a man under varying conditions, elaborate and expensive apparatus is required; and the advantages claimed for the special treatment of the food just discussed can only be fully tested by prolonged and laborious experiments calling for a considerable staff of workers.

"It is of great importance that the mind of the lay public should be disabused of the idea that medical science is possessed of final information concerning questions of nutrition. This is very far indeed from being the case. Human nutrition involves highly complex factors, and the scientific basis for our knowledge of the subject is but small; where questions of diet are concerned, medical teaching, no less than popular practice, is to a great extent based upon empiricism.

"But the scientific and social importance of the question is clearly immense, and it is greatly to be desired that its study should be encouraged."

This was indeed a triumph for Mr. Fletcher's patient and persistent labours. He had secured the support of the greatest authorities in the world to obtain a respectful hearing. He was now a man with an important problem, which, sooner or later, some one or other would have to solve. He had the good fortune to find another practical sympathiser in Professor Bowditch, of the Harvard University Medical School, who introduced him to Professor Chittenden at Yale, who was not only the Director of the Sheffield Scientific School and President of the American Physiological Society, but is one of the most eminent of physiological chemists. Here he was also especially fortunate, because, for the first time in his search, he found in Dr. William G. Anderson, Director of the Yale University Gymnasium, a man who

was a human physiologist more than in name. Dr. Anderson not only studied undergraduates, but was able to make experiments with them, as he was their trainer in athletic exercises. Dr. Anderson was able to render Mr. Fletcher a signal service by setting down in black and white measurements which showed that his claims to the possession of exceptional fitness were actually and measurably true.[1]

[1] Dr. Anderson's report is embodied in Professor Chittenden's account of Mr. Fletcher's examination as printed in the "Popular Science Monthly," as follows:

"The writer has had in his laboratory for several months past a gentleman (H. F.) who has for some five years, in pursuit of a study of the subject of human nutrition, practised a certain degree of abstinence in the taking of food and attained important economy with, as he believes, great gain in bodily and mental vigour, and with marked improvement in his general health. Under his new method of living he finds himself possessed of a peculiar fitness for work of all kinds, and with freedom from the ordinary fatigue incidental to extra physical exertion. In using the word 'abstinence,' possibly a wrong impression is given, for the habits of life now followed have resulted in the disappearance of the ordinary craving for food. In other words, the gentleman in question fully satisfies his appetite, but no longer desires the amount of food consumed by most individuals.

"For a period of thirteen days, in January, he was

There is one thing that a scientific man has clearly fixed in his head, and that is

under observation in the writer's laboratory, his excretions being analysed daily with a view to ascertaining the exact amount of proteid consumed. The results showed that the average daily amount of proteid metabolised was 41.25 grams, the body-weight (165 pounds) remaining practically constant. Especially noteworthy, also, was the very complete utilisation of the proteid food during this period of observation. It will be observed here that the daily amount of proteid food taken was less than one-half that of the minimum Voit standard, and it should also be mentioned that this apparent deficiency in proteid food was not made good by any large consumption of fats or carbohydrates. Further, there was no restriction in diet. On the contrary, there was perfect freedom of choice, and the instructions given were to follow his usual dietetic habits. Analysis of the excretions showed an output of nitrogen equal to the breaking down of 41.25 grams of proteid per day as an average, the extremes being 33.06 grams and 47.03 grams of proteid.

"In February a more thorough series of observations was made, involving a careful analysis of the daily diet, together with analysis of the excreta, so that not alone the proteid consumption might be ascertained, but likewise the total intake of fats and carbohydrates. The diet consumed was quite simple, and consisted merely of a prepared cereal food, milk, and maple sugar. This diet was taken twice a day for seven days, and was selected by the subject as giving sufficient variety for his needs and quite in accord with his taste. No attempt was made to conform to any given standard of quantity, but the subject took each day such amounts of the above

measurement, for science is measurement. Take away the balance from the chemist and

foods as his appetite craved. Each portion taken, however, was carefully weighed in the laboratory, the chemical composition of the food determined, and the fuel value calculated by the usual methods.

"The following table gives the daily intake of proteids, fats, and carbohydrates for six days, together with the calculated fuel value, and also the nitrogen intake, together with the nitrogen output through the excreta. Many other data were obtained showing diminished excretion of uric acid, ethereal sulphates, phosphoric acid, etc., but they need not be discussed here.

	Intake					Output of Nitrogen		
	Proteids	Fats	Carbohy	Calories	Nitro.	Urine	Fæces	Total
	Grams	Grams	Grams		Grams	Grams	Grams	Grams
Feb. 2	31.3	25.3	125.4	900	5.02	5.27	0.18	5.45
3	46.8	40.4	266.2	1690	7.50	6.24	0.81*	7.05
4	48.0	38.1	283.0	1747	7.70	5.53	0.81*	6.34
5	50.0	40.6	269.0	1711	8.00	6.44	0.81*	7.25
6	47.0	41.5	267.0	1737	7.49	6.83	0.81*	7.64
7	46.5	39.8	307.3	1852	7.44	7.50	0.17	7.67
Daily Av.	44.9	38.0	253.0	1606	7.19	6.30	0.60	6.90

* Average of the four days.

"The main things to be noted in these results are, first, that the total daily consumption of proteid amounted on an average to only 45 grams, and that the fat and carbohydrate were taken in quantities only sufficient to bring the total fuel value of the daily food up to a little more than 1,600 large calories. If, however, we eliminate the first day, when for some reason the subject took an unusually small amount of food, these figures are increased somewhat, but they are ridiculously low com-

you take from him more than his eyes,— you rob him of his science. Yet personal

pared with the ordinarily accepted dietary standards. When we recall that the Voit standard demands at least 118 grams of proteid and a total fuel value of 3,000 large calories daily, we appreciate at once the full significance of the above figures. But it may be asked, was this diet at all adequate for the needs of the body — sufficient for a man weighing 165 pounds? In reply, it may be said that the appetite was satisfied, and that the subject had full freedom to take more food if he so desired. To give a physiological answer, it may be said that the body-weight remained practically constant throughout the seven days' period, and further, it will be observed by comparing the figures of the table that the nitrogen of the intake and the total nitrogen of the output were not far apart. In other words, there was a close approach to what the physiologist calls nitrogenous equilibrium. In fact, it will be noted that on several days the nitrogen output was slightly less than the nitrogen taken in. We are, therefore, apparently justified in saying that the above diet, simple though it was in variety, and in quantity far below the usually accepted requirement, was quite adequate for the needs of the body. In this connection it may be asked, what were the needs of the body during this seven days' period? This is obviously a very important point. Can a man on such a diet, even though it suffices to keep up body-weight and apparently also physiological equilibrium, do work to any extent? Will there be under such condition a proper degree of fitness for physical work of any kind? In order to ascertain this point, the subject was invited to do physical work at the Yale University Gym-

observation has shown that quite recently, in at least two of the largest physiological

nasium, and placed under the guidance of the director of the gymnasium, Dr. William G. Anderson. The results of the observations there made are here given, taken verbatim from Dr. Anderson's report to the writer.

"'On the 4th, 5th, 6th, and 7th of February, 1903, I gave to Mr. Horace Fletcher the same kind of exercises we give to the Varsity Crew. They are drastic and fatiguing and cannot be done by beginners without soreness and pain resulting. The exercises he was asked to take were of a character to tax the heart and lungs, as well as to try the muscles of the limbs and trunk. I should not give these exercises to Freshmen on account of their severity.

"'Mr. Fletcher has taken these movements with an ease that is unlooked for. He gives evidence of no soreness or lameness, and the large groups of muscles respond the second day without evidence of being poisoned by Carbon dioxide. There is no evidence of distress after or during the endurance test, *i. e.*, the long run. The heart is fast but regular. It comes back to its normal beat quicker than does the heart of other men of his weight and age.

"'The case is unusual, and I am surprised that Mr. Fletcher can do the work of trained athletes and not give marked evidences of over-exertion. As I am in almost constant training I have gone over the same exercises, and in about the same way, and have given the results for a standard of comparison. [The figures are not given here.]

"'My conclusion, given in condensed form, is this:

laboratories in Europe, there were no scales that would weigh anything larger than a

Mr. Fletcher performs this work with greater ease and with fewer noticeable bad results than any man of his age and condition I have ever worked with.'

"To appreciate the full significance of this report, it must be remembered that Mr. Fletcher had for several months past taken practically no exercise other than that involved in daily walks about town.

"In view of the strenuous work imposed during the above four days, it is quite evident that the body had need of a certain amount of nutritive material. Yet the work was done without apparently drawing upon any reserve the body may have possessed. The diet, small though it was, and with only half the accepted requirement in fuel value, still sufficed to furnish the requisite energy. The work was accomplished with perfect ease, without strain, without the usual resultant lameness, without taxing the heart or lungs, and without loss of body-weight. In other words, in Mr. Fletcher's case at least, the body machinery was kept in perfect fitness without the consumption of any such quantities of fuel as has generally been considered necessary.

"Just here it may be instructive to observe that the food consumed by Mr. Fletcher during this seven days' period — and which has been shown to be entirely adequate for his bodily needs during strenuous activity — cost eleven cents daily, thus making the total cost for the seven days seventy-seven cents! If we contrast this figure with the amounts generally paid for average nourishment for a like period of time, there is certainly food for serious thought. Mr. Fletcher avers that he has followed his present plan of living for nearly five

dog, but in these laboratories numbers of medical students receive their training in

years; he usually takes two meals a day; has been led to a strong liking for sugar and carbohydrates in general and away from a meat diet; is always in perfect health, and is constantly in a condition of fitness for work. He practises thorough mastication, with more complete insalivation of the food (liquid as well as solid) than is usual, thereby insuring more complete and ready digestion and a more thorough utilisation of the nutritive portions of the food.

"In view of these results, are we not justified in asking ourselves whether we have yet attained a clear comprehension of the real requirements of the body in the matter of daily nutriment? Whether we fully comprehend the best and most economical method of maintaining the body in a state of physiological fitness? The case of Mr. Fletcher, just described; the results noted in connection with certain Asiatic peoples; the fruitarians and *nut*arians in our own country recently studied by Professor Jaffa, of the University of California, — all suggest the possibility of much greater physiological economy than we as a race are wont to practise. If these are merely exceptional cases, we need to know it; but if, on the other hand, it is possible for mankind in general to maintain proper nutritive conditions on dietary standards far below those now accepted as necessary, it is time for us to ascertain that fact. For, if our standards are now unnecessarily high, then surely we are not only practising an uneconomical method of sustaining life, but we are subjecting ourselves to conditions the reverse of physiological, and which must of necessity be inimical to our well-being. The possibility of more

human physiology. It was largely due to this examination of Mr. Fletcher, as to his measurable strength and endurance, by Dr. Anderson that determined Professor Chittenden to undertake the famous inquiry that resulted in his report which showed men to be able to work better,

scientific knowledge of the natural requirements of a healthy nutrition is made brighter by the fact that the economic results noted in connection with our metabolism examination of Mr. Fletcher is confirmatory of similar results obtained under the direction and scrutiny of Sir Michael Foster at the University of Cambridge, England, during the autumn and winter of last year; and by Dr. Ernest Van Someren, Mr. Fletcher's *collaborateur*, in Venice, on subjects of various ages and of both sexes, some account of which has already been presented to the British Medical Association and to the International Congress of Physiologists at its last meeting at Turin, Italy. At the same time emphasis must be laid upon the fact that no definite and positive conclusions can be arrived at, except as the result of careful experiments and observations on many individuals covering long periods of time. This, however, the writer hopes to do in the very near future, with the coöperation of a corps of interested observers. The problem is far-reaching. It involves not alone the individual, but society as a whole, for beyond the individual lies the broader field of the community, and what proves helpful for the one will eventually react for the betterment of society, and for the improvement of mankind in general."

play better, and have better health, not on the Voit standard, but on half or one-third of the amount of nitrogen the text-books prescribed as essential.

So, then, the task that the physiologists had set Mr. Fletcher at Cambridge University in England, to discredit the Voit standard, was settled for him in America. This was followed by another scientific investigation of nearly equal importance, undertaken by Dr. Folin, the chemical-physiologist on the staff of the Massachusetts General Hospital, in charge of the laboratory of the McLean Hospital for the Insane at Waverley, Massachusetts. Dr. Folin successfully explained how it was that Dr. Van Someren was enabled to maintain his health with so small an allowance of nitrogenous food. By means of an exhaustive system of chemical analysis he was able to demonstrate that not only Dr. Van Someren, but other people who were accustomed to the habit of the Voit standard of nitrogenous equilibrium, could in a short space of time acquire what

may now be called the Fletcher standard. The extensive and laborious researches of both Professor Chittenden and Dr. Folin, looked at from the point of view alone of scientific performances, were of the first rank. Professor Chittenden had the help of Surgeon-General O'Reilly, of the United States army, who secured for him the co-operation of a number of soldiers who volunteered to serve as subjects. Besides these, he had some athletes and some colleagues for the experiments. It is most important to remember, in connection with the contentions of this book, that these conclusive, confirmatory scientific experiments were undertaken in consequence of Mr. Fletcher's successful attempt to restore his own health, showing clearly that there is another and sometimes more direct way of attaining desirable results than that of finding out how first, — that of *doing* first, and finding out how afterwards. At any rate, it is far easier, now that his success has been explained, for those who wish to follow Mr. Fletcher's

lead than it was before. The length of time necessary for obtaining the authoritative recognition of Mr. Fletcher's discovery surely shows that the methods of science require fundamental modification when they deal with matters of such broad human interest.

CHAPTER III

MASTICATION AND INSALIVATION

At first sight it may be thought that there is little opportunity for novel views in the knowledge of the process of mastication. It is profitable to recollect, however, as Mr. Fletcher first pointed out, that the three inches of the alimentary region, from the lips to the soft palate, is the only part of the thirty feet of the intestinal canal where there are discriminating apparatus and functions that are in any way under the control of the will.

Pavlov has recently shown us that there are a number of nervous impulses that originate in the mouth, when the masticating and insalivating processes are properly carried out, that control the subsequent digestive processes. So that not only the quality, but the quantity, as well as the physical condition, of the ingested

food depend on the occurrences in the mouth. From these short statements it will be seen that it is the business of every one to understand the phenomena presented by the mouth as thoroughly as possible.

In the writings of a famous German anatomist a statement was made that passed unnoticed by both anatomists and physiologists till Mr. Fletcher stirred up our interest in the subject. In Gegenbaur's "Anatomie der Wirbelthiere," p. 90 (Vergleichender), is found the following: "The bifurcation of the alimentary canal below the soft palate does not depend only on its relation with the epiglottis, but also on the condition of the food. The exclusive use of this means of swallowing is only possible with finely divided food. . . . I have called this way of taking food Poltophagy (poltos = masticated, finely divided), and the other, Psomophagy (psomos = biting, tearing)." This most important observation was one that Gegenbaur recommended should be most carefully investigated.

To appreciate thoroughly what follows, it is necessary to realise the law of atrophy and hypertrophy. Atrophy of muscle means that, from want of use, the substance wastes and the muscle ultimately becomes useless. This phenomenon is well illustrated in the case of those Indian fakirs who hold their arms above their heads till the joints are fixed and the muscles are permanently wasted. Hypertrophy means unusual development from unusual work; as, for instance, in the case of blacksmiths, with their well-developed arms, shoulders, and chests. In anatomy it is found to be a law that one can look on muscles as a crystallisation of function; that is to say, that their presence alone implies that they are used, and as they are used they are wanted by the animal. Another thing that anatomy teaches is that there is nothing superfluous in the body, and so consequently the structures that are functioned in so vitally important a region as the mouth, it is needless to say, merit our most respectful consideration.

If one examines the soft palate of a dog, it is seen to be thin, even translucent; in its centre are found merely three or four muscular fibres instead of a muscle. These fibres are too scanty and scattered to aid, to any but an insignificant extent, the elevation of the soft palate. The epiglottis is a cartilaginous body found over the larynx and attached to the base of the tongue. In the dog the epiglottis is very small and applied closely to the tongue. The food is swallowed over the top of the epiglottis instead of by its sides. The translucent soft palate and the small and insignificant epiglottis are evidence that neither of them serves any very important purpose to the dog.

When, on the other hand, a horse is examined, one finds an entirely different state of affairs. There is a long, muscular soft palate as long as the hard bony palate. The epiglottis, which is, relatively speaking, enormous, stands up so as to divide the opening into the œsophagus into two. Each of these openings in the

relatively-large horse is no larger than the single opening in a small dog. In the case of the horse, then, one finds that the masticated and insalivated food is divided into two currents passing down either side of the epiglottis. The openings are so small and valve-like that a horse is actually unable to breathe through its mouth.

The differences between the horse and dog in this respect then are, that the horse is *obliged* to masticate, and is therefore poltophagic; and the dog swallows his food in large pieces, and is therefore psomophagic; in other words, he has not efficient machinery for mastication, but he has good apparatus for tearing.

When the principles of atrophy and hypertrophy are borne in mind in these instances, it becomes of great interest to observe the state of affairs in man. It is of the utmost importance to recollect that these differences between the horse and dog are by no means merely anatomical. There is, as well, an absolutely different

digestive apparatus from both a chemical and physical point of view. Just what these differences in metabolism are, is not yet thoroughly known. That is to say, the differences have not been so clearly defined as to vitiate those conclusions drawn from physiological experiments on animals being applied to the physiological phenomena in man. So that when one is able to show that in the case of man there is a full development of the muscles of the soft palate, it acquires a more important significance than appears at first sight. Enough has been said to show that it is of the highest importance for each of us to have the clearest information of the aptitudes and attributes of the soft palate in man. The following experiments demonstrate certain phenomena that can be observed with the mouth.

The apparatus is very simple, consisting of a U-tube of a sufficiently large size, and a physiological instrument known as a Marey's ambour, which consists of a drum provided with an india-rubber mem-

brane. To this membrane is attached a lever which records its movements.

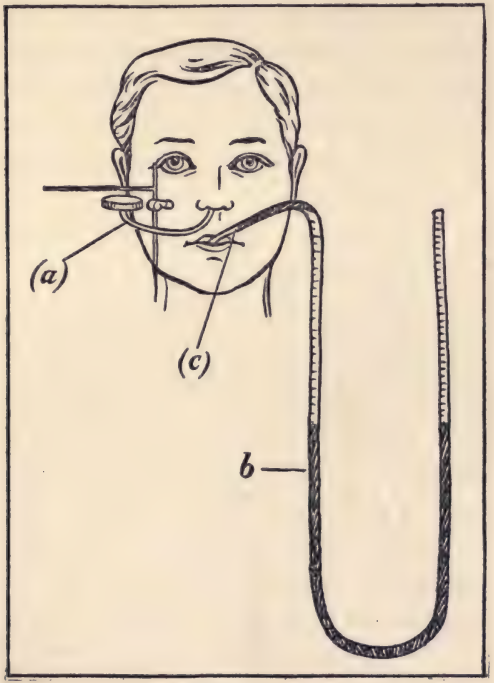


FIGURE 1.

The cavity of the drum communicates by means of an india-rubber tube with the

cavity in which the variations of pressure are recorded. Accordingly, if the india-rubber tube is connected with one nostril while the other is closed, it will be found in this experiment to record the variations of pressure due to respiration. The U-tube is filled with coloured water, and one of its limbs is provided with a mouthpiece.

If one causes a positive (or blowing) pressure in the mouth the water ascends in the remote limb. If a negative (or suction) pressure is created the water rises in the proximal limb. Both negative and positive pressures can be attained and maintained, as well as rapidly alternating negative and positive pressures. From 40 to 50 c.cms. of the liquid can be sucked up into the mouth. Only 15 to 20 c.cms. can be sucked up when the tongue is protruded. Now any of these movements can be carried out during (1) Slow inspiration, (2) slow expiration, (3) absence of respiration, (4) hurried respiration, (5) when the tongue is protruded. These

coincident and respiratory movements are shown by the lever of the Marey's tambour. The possible agencies in the production of such movements are: the respiratory muscles, the tongue muscles, and the muscles of the cheeks and soft

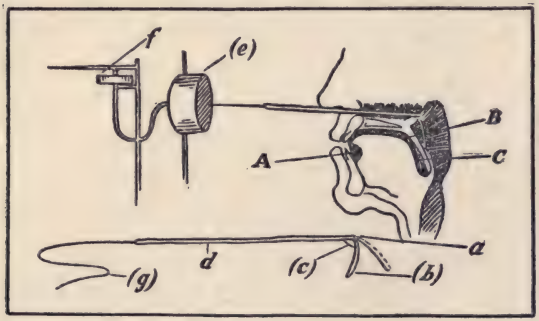


FIGURE 2.

palate. If, then, the respiratory movements are eliminated, the tongue eliminated through its protrusion, and the cheeks seen and felt not to be concerned with the recorded movements, there is clear evidence that the movements are produced by the muscles of the soft palate.

When, however, it is wished to ascertain the character of the movements of the soft palate during mastication, it is necessary to record the movements from its hinder surface. The following experiments are obviously not of so clear a character as the former, because one has to make use of the narrow passage in the nostril. An instrument the size and shape of an Eustachian catheter is used; it is jointed at *a*, the movable portion *b* being attached to a thread *c*, which passes through a jointed handle *d*. This instrument can be passed through the nostril so that its movable limb *b* can rest on the hinder surface of the soft palate. The thread that passes through the hollow handle *d* can be attached to the tambour shown in the diagram, so as to record the movements graphically on a revolving drum covered with smoked paper.

In Figure 3 is shown one of these graphic registers: *A* shows the record of a positive or blowing pressure, produced

by, and coincident with, a forward movement of the soft palate; *B* shows a negative or suction pressure, produced by a backward movement of the soft palate; *C* shows rapidly alternating positive and negative pressures.

It is clear, then, that if the soft palate moves forward during the production of

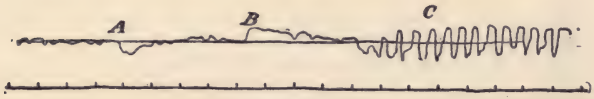


FIGURE 3.

positive pressures and backward in negative pressures, it is an active agent in their production.

The former experiments also show that the soft palate makes the cavity of the mouth air-tight.

In Figure 4, graphic records of movements of deglutition are shown.

B shows a tracing that follows the partial protrusion of the tongue. Warm water is poured into the space between the soft palate and the tongue. When 10

to 15 c.cms. have been introduced, a deglutition takes place. This comprises a forward movement of the soft palate. In tracing *A*, on the contrary, there is an effort of deglutition where a mouthful is swallowed in a gulp. In this case, instead of an active pushing movement as in *B*, there is a sustained backward movement,

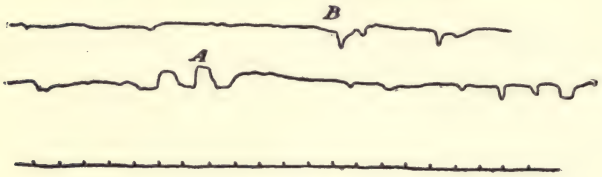


FIGURE 4.

showing that the soft palate is raised. *B* is an instance of poltophagic and *A* of psomophagic swallowing.

It must be remembered that the excursions of the movable limb of the instrument are necessarily very limited, and that there would not be a distinction between a lifting movement (as in psomophagic deglutition) and an increased concavity during the time that the lower border

is applied to the tongue, as it is presumed to occur during the production of a negative pressure in the closed mouth.

Poltophagic Mastication and Deglutition.

I will describe the ingestion of a piece of currant cake, as it best illustrates the phenomena of thorough mastication. During mastication there is a complex series of co-ordinated, unconscious, and automatic contractions of the muscles of the cheeks, the lips, the jaws, the tongue, and the soft palate, excited by afferent and efferent impulses. As the starch is transformed into dextrose it is dissolved by the saliva. If it was allowed to remain in the anterior buccal cavity it would inhibit the further action of the ptyalin. This is prevented by the action of the tongue and soft palate, alternately producing positive and negative pressures in the closed mouth. From time to time samples of the fluid contents of the anterior buccal cavity are withdrawn into the buccal passage (its further progress may possibly be arrested

by the pressure of the tongue against the hard palate if it is not acceptable to the end organs in the neighbourhoods of the circumvallate papillæ), where it passes on to the posterior buccal cavity.[1] When sufficient has collected, a swallowing impulse is excited. It is presumed that the tongue is pressed upwards against the hard palate so as to form a *point d'appui* for the contraction of the soft palate, to close the posterior buccal cavity, and to help in the expulsion of its contents. The mylohyoid in contracting makes the laryngeal furrows more vertical. The fluid contents are then forced out into the pharynx, the buccal cavity is reclosed, and the material is collected for the next poltophagic deglutition.[2] When the process of

[1] I have frequently remarked during the last two years, while there is a diminution of the contents of the mouth during mastication, that fluid can be regurgitated from the posterior buccal cavity (while it is filling) on to the dorsum of the tongue, and that it is rapidly sucked back again. I have been able to repeat this experiment several times in succession.

[2] This part of the description is provisional only, and depends on whether the nature of the soft palate as shown

mastication and deglutition is completed, there is nothing left but some almost dry currant skins and stones; even these may possibly be disposed of if the teeth are good enough to divide them finely.

It is necessary to understand clearly what is meant by the phrase, "a complex series of co-ordinated, unconscious, and automatic movements of the muscles due to reflex actions."

When a pianist reads music, an impulse passes, by means of the action of rays of light stimulating the nerves of sight, to the brain, where it is interpreted. Then a series of changes takes place in the brain cells that convey other impulses to the nerves which control the muscles of the forearms, so that the correct note should be struck. This long series of complicated movements is conducted with such rapidity by practised players that it actually interferes with and practically arrests the movements if the attention of the will

by the tracing is confirmed by actual observation of a case in which the maxilla has been removed.

is used to direct them. In the practised player, the incidence of the ray of light on the brain is apparently coincident with the striking of the note, so rapid is it. This, then, is an example of co-ordinated, automatic, and unconscious acts produced by education.

The movements of mastication and deglutition are so complicated that the series of events has to be as natural as breathing. To give as clear an idea as possible of the actual complexity of the processes, it will be necessary to go through the most prominent movements and reflex acts. When food is taken into the mouth a flow of saliva results. This dissolves the soluble parts and enables the material to give more accurate information of its character to the special nerves. The special sense nerves then convey impulses that affect the roots of the nerves to the brain, which control six large glands as well as a number of smaller ones. These impulses arrange that the right mixture of saliva be poured into the mouth. At the same

time the teeth, tongue, and cheeks are engaged by means of another series of impulses in dividing the food as finely as possible. The tongue has another function, in that it not only aids mastication, but it secures the passage of prepared food into the pharynx. It is capable, by means of its interlacing fibres, of assuming an amazing number of different shapes.

To enable one to understand its action, a good plan is to look on the tongue and soft palate as two lock-gates interposed in the stream of the food passing from the mouth to the pharynx. The tongue forms the first gate, allowing the passage of food into the lock (the space between the soft palate and the tongue) till it is full, then the tongue closes down and shuts off the cavity of the mouth; this is followed by the opening of the soft palate, which is the lock-gate separating the lock from the opening into the œsophagus.

It is clear, then, that man differs from the horse, in that he can swallow food psomophagically and the horse cannot.

He differs from the dog, in that dogs are unable to swallow food poltophagically. That is to say, that man has at the same time a poltophagic and a psomophagic faculty. In the case of the anthropoid apes and man there has been a shortening of the upper jaw from before backwards, on account of the assumption of the erect posture which has resulted in the soft palate becoming more vertical, and thus enabling psomophagic deglutition to be practised. The important matter to decide is, whether man approximates to the metabolic characteristics of the poltophagic or to those of the psomophagic animals. To recapitulate, Mr. Fletcher has drawn attention to a human faculty that was not recognised; this faculty is constantly made use of, in that the necessary apparatus in the shape of nerves and muscles are present. If the process is used to its full extent, a certain series of phenomena result, which will be recorded in the next chapter.

CHAPTER IV

TASTE AND APPETITE

MR. FLETCHER not only described what he so aptly called a food-filter, but he also claimed to be able to demonstrate that the body is capable of deciding by taste and appetite the character and amount of food that should be eaten. More than three years' personal experience has convinced me of the substantial truth of this statement.

In the last chapter, the scientific support that has resulted from the study of the apparatus of mastication suggested by Mr. Fletcher was described. It is now necessary to examine the factors that are concerned with appetite and taste.

Appetite had been somewhat neglected by physiologists on account of some observations that had been made in the famous case of Alexis St. Martin, a Cana-

dian, who had an aperture made in his stomach as the result of a gunshot wound. These observations were thought to show that the stimulus for the secretion of the gastric juice was mere contact of the food with the walls of the stomach. This idea, since then, has dominated the attitude of the medical profession towards feeding in health and disease. It has resulted in patients being fed whether they had an appetite or not. Speaking generally, there are many cases where it is now thought to be better to give only small quantities of food when the appetite is bad, and in certain cases an indication is seen of omitting food altogether; for instance, Professor Héricourt of Paris recommends that in bad cases of dyspepsia it is advisable to put the patient to bed for a week or ten days without food.

The idea of the contact stimulus for the flow of gastric juice has received its death-blow from the recent researches of Professor Pavlov, who showed very clearly that by far the most important stimulus

was in all cases appetite, or taste. It is not unworthy of reflection that an eminent professor should be awarded the Nobel Prize for demonstrating, at so late a period of the history of Physiology, such an important fact in the phenomena of digestion. The world did not suffer so much for the tardiness of physiological researchers in emphasising this important factor as it might have done, because it was fortunately one of those facts that are called, somewhat too contemptuously, mere popular or instinctive knowledge. When Mr. Fletcher was so emphatic in his claims of the value of appetite and taste in feeding, no notice was taken. But so soon as a number of experiments which proved his claims, made in a laboratory on dogs, were reported, many medical men were astonished that so plain and obvious a matter should not have been known before. Can we not fairly say from this failure to notice one of the most important indications in human nutrition, that in at least some questions that apper-

tain to humaniculture the ways of science cannot be described as business-like and methodical? It is useful to recall the words in which Professor Pavlov summed up his conclusions:

"It is only by the establishment of this passionate desire for eating that unerring and untiring nature has linked the seeking and finding of food with the commencement of the work of digestion. That this factor, which we have now so carefully analysed, stands in closest relation with a phenomenon of daily life — namely, appetite — may easily be predicted. That agency which is so important to life and so full of mystery to science becomes at length incorporated into flesh and blood, transformed from a subjective sensation into a concrete factor of the physiological laboratory. We are justified in saying that appetite is the first and mightiest exciter of the secretory nerves of the stomach."[1]

[1] It is to the credit of Pavlov that he refers to Blondlot, a French physiologist of fifty years before, as having as-

As to the real physical factor that determines the phenomenon of appetite, beyond the general conception that it is an indication of the want of food, we have no clew. To give some idea of the appetite phenomena that have been observed in the practice and study of poltophagy, it will be necessary to deal briefly with the points of interest under the following headings:

(1) *Variations in Appetite.* Appetite varies from a well-defined and decided appetite for certain articles of food, such as rice, meat, bread, or butter, to what is sometimes called a "finnicking" appetite. There may be an ill-defined general appetite, the state in which one says, "Anything will do, I really don't know what I want." Speaking generally, an individual is usually at his best with a definite appetite for one or more ingredients of the food groups detailed in the following pages.

serted in his time what he (Pavlov) has proved to be true as above, but his work had not been properly appreciated by physiologists since his time.

(2) *Cessation of Appetite.* There is an invariable and striking phenomenon observed in the practice of poltophagy, which is the manner in which one knows that no more food is required. Sometimes, almost without warning, appetite ceases, and if eating is persisted in, even the next mouthful is distasteful. This phenomenon is usually noticed the first time that the process is practised after attention has been directed to it, which may show that, in these cases at any rate, it is due to tiredness of the muscles of mastication; another suggestion is that the sudden cessation of appetite is due to the failure of the secretion of saliva. At any rate, this well-marked end-point to appetite affords a most valuable natural protection to the needs of the body, which it is obvious must vary from day to day. When this faculty has been allowed to be blunted by disuse, there is nothing but a sense of repletion to guide one when to cease eating, though of course there are many who are abstemious by habit. It

is more than probable that the group of diseases alluded to earlier as those that Bouchard looks on as being associated with "slow nutrition" are the result of psomophagic habits.

(3) *The Frequency of Appetite.* According to a valuable suggestion of Mr. Fletcher, no food should be taken without appetite. In the case of a beginner, in the practice of careful poltophagy appetite may come at irregular times, varying naturally with the way in which the day has been spent. In those cases where there is a sedentary occupation without any great amount of physical exertion there is commonly a call for only one meal in the day, somewhere about midday. A second appetite may develop between five and six. There should be no attempt to make any alterations in the ordinary meal-times without strong counter indications. One of the most prominent changes is the absence of appetite for breakfast, which enables a good day's work to be done before the midday

meal. This may not occur for more than two years after beginning the practice, so that it is by no means advisable to force matters, but to be guided by the appetite.

(4) *The Absence of Appetite.* When there is no appetite whatever, it is far better to refrain from taking food, even for so long an interval as two or three days, provided always that there is no uneasiness or fear of the consequences. It is usually advisable under such circumstances to go to bed, especially if there is much acidity.

(5) *Hunger.* There is a great difference between hunger and appetite. It may be said that in connection with the practice of poltophagy there is practically none of that uncomfortable faint hunger so often present with psomophagic habits. When for any reason it is necessary to omit the usual meal, there is little discomfort, and the appetite seems to be conveniently postponed; this is especially true when one is much occupied.

Food and Taste

An attractive feature of Mr. Fletcher's claims is that the body can be trusted to choose the food it requires by taste. In other words, that the food that gives the greatest pleasure is the best that can be taken. With certain limitations which can be readily understood, this is true. A good example is afforded by the following case. There was not unfrequently an inordinate appetite for fruit-juice, as much as the juice of from twenty to thirty oranges or two or three pounds of grapes being relished. The valuable constituent of the juice was its vegetable salts; it was therefore assumed that the body needed them. They were administered in another form; a solution (or soup) was prepared by boiling a quantity of finely divided vegetables in milk or water for over two hours. The usual method of boiling vegetables in water and throwing it away, leaves mainly the indigestible cellulose residue which is responsible for

the indigestion of some vegetarians. At any rate, in this case as well as in others, the craving for this solution of salts continued for long periods that accompanied some interesting symptoms incident to the disappearance of chronic gout.

Foods for which appetite has a distinct craving at varying intervals can be conveniently grouped under the following heads:

(1) *Starches, Dextrines, Sugars.* It is noticed that in some cases there is a decided absence of appetite for starch, and, if it is taken in spite of the disinclination of appetite, it is apt to be followed by acidity and indigestion. In such cases it will be found that dextrinised starch is readily tolerated and called for regularly by the appetite. Starch is easily dextrinised by thoroughly baking the bread a second time with considerable heat, by toasting, or by frying starchy foods in oil or butter. This fact probably accounts for the popularity of that large class of patent cereal foods that have the common

characteristic of being prepared by super-cooking. Starch itself is usually called for in the form of potatoes, rice, and bread. It has been noticed in a number of cases that a craving for pastry and candies sometimes occurs after the midday meal in the late afternoon. This appetite has been found to be absent when sufficient dextrine has been partaken of earlier in the day.

(2) *Fats.* Practically, without exception, all early cases crave an unusual quantity of fat, either as butter or cream; as much as from 100 to 150 grms. a day being habitually taken. In one case of obesity this amount was taken as well as one or two pints of milk; during this time there was a loss in weight of about two kilograms a week. When this appetite is prominent, it is necessary to provide the purest possible cream and butter. Early cases seem to be peculiarly liable to disturbances in consequence of any defect in the quality or freshness of food.

(3) *Proteids.* The appetite for this

form of food tends to be the least decided. When for any reason there has been a deficiency of proteid in the diet, it is commonly recognised by faintness, nervousness, or irritability, rather than a defined appetite. This is by no means always the case, especially when one form of proteid is invariably taken. Perhaps this occurs because proteid is the tasteless ingredient of so many foods. In the case of meat, a fierce and unmistakable craving is occasionally met with, following on physical strain and worry, especially when there is want of condition. A plausible explanation of this condition is afforded by the research of Dr. Sloss of Brussels, who demonstrated that muscle gives off NH_3 instead of CO_2 when there is tetanus. This may show that in cases where there is habitual strain, and possibly in cases of "nutrition retardante," the muscle tissues tend to consume proteid. In other words, this form of proteid hunger (it is usually more than appetite) perhaps shows that it is easier for the muscle to obtain its mate-

rial for energy from proteid than from fat or starch.

It is interesting to note that healthy starch feeders have apparently far more staying power, and, speaking generally, they show the least evidence of wear and tear of the body. This fact is well illustrated in the case of the Tyrolese peasants, where a man over fifty can carry two hundred and twenty pounds up a mountain of three thousand feet. It is said that the British navvy (day laborer), who eats on an average some two to three pounds of meat a day, is of little use after forty. Is it not possible that as starch burns up completely when oxidised into H_2O and CO_2, it is less expensive to the organism than either fat or proteid? It is interesting to note that in the author's case there is a decided tendency to take starch in increasing quantities with much less fat than in the earlier stages of poltophagy.

(4) *Vegetable Salts.* Most fruit and vegetables are probably mainly useful for their salts. That such salts are an im-

portant ingredient in diets is well known. For instance, scurvy and other troubles occur when they are omitted. It is well to take care how they are cooked, and to remember that boiling them in water boils out their soluble salts. There is no intention, it need hardly be said, to discourage fruit if the appetite calls for it. These remarks are only to be taken as hints and suggestions that experience has shown to be useful.

(5) *Fluids. — Water.* Speaking generally, it will be found that the practice of poltophagy considerably lessens the daily intake of water. Economy is shown in this as well as in the case of the other foods. In the early stage, however, especially in cases of obesity, it is commonly found that there are a number of sudden variations in weight, as much as over four pounds daily of either loss or gain. In such cases the body generally retains or throws off an amount of water corresponding to the body weight lost or gained; weight thus gained may be retained for

some days. *Alcohol.* Cravings for alcohol show a decided tendency to disappear. There is in some cases an increased power of appreciation for small quantities of fine wines. In early cases there is a distinct appetite occasionally for a restricted amount of alcohol, especially when there is severe exertion or excessive cold, but the desire is quickly satisfied.

CHAPTER V

CHANGES PRODUCED BY POLTOPHAGY

Less food is taken, the appetite is more discriminating, much more pleasure is taken in food, and meals are usually reduced in number to one or two a day. As regards constitutional changes produced by poltophagy, there is marked improvement in general health, — one is capable of more exertion and mental work; there is more happiness and less tendency to worry. These changes may be rapid or slow, varying with different people. They depend naturally on the state of health and the age. The changes are sometimes conspicuously slow and progressive, recalling the growth of trees, which is only noticeable after long periods, and not from day to day.

Changes in the Waste (Fæces)

The most striking change is found in the solid waste, a marked decrease in

the quantity and weight being noted. There is no longer the unpleasant odour that has been thought to be characteristic of it. This change is not only cleanly, as it seems to eliminate as well the disagreeable odour sometimes noticed in the perspiration, but, in all probability, it has far-reaching results on the wear and tear of the body. Thus Professor Metchnikoff finds that the greatest disharmony from which the body suffers is a result of the putrescence that occurs in the large intestine, and in consequence there is a continual stream of poisonous products of decay passing into the body from the alimentary canal. As we have seen, there are grounds for the belief that it is these products which are responsible for so many diseases. But instead of removing the large intestine, as Professor Metchnikoff suggests, Mr. Fletcher would advise the practice of poltophagy, which obviates so dubious a leap into scientific "harmony." To understand the terms that are used in the classification of the different forms the

waste assumes, it is necessary to note that the large intestine is divided into a series of sacculi. These sacculi are due to the presence of transverse bands of muscular fibres disposed at regular intervals. The character of the waste that is usually observed can be classified as follows:

(*a*) Mouldings of the sacculi of the large intestine, which are of about the size of a hazel nut, smooth, and occasionally faceted. Their colour is occasionally dark green, more frequently dark brown, less frequently a lighter brown, but this may be partly dependent upon the sort of food taken. There is a clean fracture between the mouldings showing a marked dryness. They are usually covered with a thin coating of mucus.

(*b*) Adherent forms of (*a*). The adherent masses are obviously formed by the adhesions of the sacculated mouldings; they are usually mixed with the isolated form of moulding described above. Their colour is generally lighter than (*a*), and they are usually a little less hard.

(*c*) Rectal mouldings with indications of the sacculi mouldings. This form varies from that of an ordinary rectal moulding marked with wavy lines, to distinct and unmistakable prominences showing the mouldings of the sacculi of the large intestine. The colour has a tendency to be lighter and the material to be of a softer consistency.

(*d*) An ordinary unmarked rectal moulding which has a tendency to be of a lighter colour and less firm in consistency.

(*e*) An unformed soft motion. The most common form is that of the isolated mouldings of the sacculi, the other forms being exceptional in connection with the practice of careful poltophagy.

A very interesting variety of waste is found when there is intestinal irritation from any cause, when there is occasionally seen a series, as it were, of the forms described above, commencing with the isolated mouldings of the sacculi and ending with the soft unformed material. This might be thought to indicate that the dif-

ference in form merely shows the length of stay in the intestinal canal. In several cases the habitual length of time between ingestion and egestion (shown by taking charcoal) has been found to be from three to five days, probably showing that the material does not cause irritation to the intestinal canal. There is usually not a daily evacuation in the early stages of poltophagy; there may be intervals of from two, to as many as three or four days.

Changes in the Large Intestine

All those who have had experience in the observation of subjects in the dissecting-room, etc., cannot fail to have noticed the large size of the sigmoid flexure commonly found; sometimes it is enormous. In one case in which the bowel had been large it is now very much smaller and muscular (more distinctly felt); the mouldings described above can be felt *in situ*. In this case there had been a period of trouble that was due to the accumulation

of fæces in the neighbourhood of the cæcum. The question naturally occurs to one that in the event of a person having a large sigmoid flexure there might be some difficulty from atony, the bowel failing to deal with the diminished quantity of fæces. This may also explain the long intervals of time between the evacuations, as noted above. The habitual state of the fæces can, I think, be an indication of the condition of the bowel, if not an indication of the state of the muscular coats; at any rate, of the size of its lumen.

Before proceeding to the actual directions for the practice of poltophagy, it is necessary to carefully consider the following points on the nature of what is called body-habit and the influence of suggestion.

Considerations involving Body-habit

A faculty possessed by all living organisms and by man to a high degree is the power of adaptation to surroundings. This faculty holds out brilliant hopes for the future, its chief use at present being

to defer death while the body is exposed to conditions that cause degeneration; in the future it will be the aptitude or quality of variation that can be better used to improve the human faculties and aptitudes. Those cases, for instance, that suffer from chronic gout, rheumatism, or any of those formidable complaints grouped under the term of "slow or retarded nutrition" (see Chapter 10), must not be looked on as either foolish, rash, or under some peculiarly sad dispensation, being victims of circumstances that they cannot control. It is becoming more and more clear that these conditions are the direct consequences of the ignorance of the science of adaptation to surroundings. The extensive physical changes that take place both externally and internally in unscientific adaptation are those that have been so carefully described and classified by pathologists. They vary from those leading to more or less imminent death, to those that, though alarming, are permanently remediable in a short space of time.

At any rate, the permanent changes are in the character of scars, as indelible, but it is to be hoped in many cases as harmless, as those on the surface of the skin. Not only are these scars present, but the protective apparatus of the body has evolved certain habits of a metabolic character from the changes induced by its reaction to the bad environment.

There is nothing more thoroughly understood by the members of the medical profession than the danger of interfering too rashly with the habits of a lifetime. It is sometimes safer to remove a limb than to interfere with them. It is well known that in cases of alcoholism, morphinism, etc., though it is clear that the poison is slowly causing death, a too sudden cessation may sometimes actually cause death. Every one must recall instances of those unfortunate men who, having led a busy and active life, decide to retire and enjoy themselves. If they can substitute other activities for those that were plentifully provided by their busi-

ness, all well and good, — the change will prove beneficial. But in the frequent cases where a life of lazy ease is led, with good feeding, carriage exercise, and a tendency to take more alcohol than usual, the prospects are different. The body is deprived of the powerful stimuli of work and activity, and, being too far gone to adapt itself to the new conditions, it does not take long to show what is the cost of the ignorance of adaptation.

The reason for going into these details is to explain that sooner or later a body that has been obliged to adapt itself to daily errors in living contracts more or less permanent changes. After regeneration is effected, it is as if a fire were put out; the seriousness of the condition depends on how long and where the fire has been burning.

The point that it is desirable to emphasise as earnestly as possible is, that if any contemplate the adoption of poltophagy, they should do so after consultation with their medical adviser, who will probably

put the pros and cons before them. This is not said in any alarmist spirit; it is only mentioned in order to point out that there are more people sitting on the edge of a precipice, as it were, than is usually thought to be the case. Such a dangerous seat may be occupied for a long time, provided all goes on quietly without disturbance. Then, again, we know that persons who realise their peril clutch at anything which even remotely promises to afford them relief. Poltophagy is not to be looked upon as a certain panacea. It is, however, a fundamental aptitude that often accomplishes wonders of recuperation.

Suggestion

It is only when one has had attention continuously directed to the study of phenomena, such as taste and appetite, that one begins to appreciate the extraordinary way in which suggestions almost as old as one's self continue to influence daily life. It will only be when science

has turned its attention to the importance of environment in the daily life of children especially that the world will be freed from the cloud of suggestions that tyrannise over it. Tyranny is the only word to express any other than a positive normal basis for daily life; that is to say, when false suggestions are permitted to interfere with the full exercise of the body's organs.

A person known to the author had a great difficulty with a suggestion of early childhood, inculcated by an old nurse, that nothing should ever be left on his plate. There are grounds for thinking that the habit thus acquired was as responsible as any other factor for gout and rheumatism, that started at twenty and went on for some twenty years. Any who will ask themselves for a week the following questions, and record the answers, will be astonished how they leave questions dealing with the food they eat to chance. The first question to ask is why we eat each article of food, and why we crave it; then to ascertain what precautions have been

taken to obtain perfectly pure food of good quality; then to ask ourselves whose hands it has been through in the processes of cooking. It will be recognised more and more in the immediate future that those who are responsible for the manufacture and preparation of food should be highly skilled people with a sense of responsibility; it is a question of far-reaching importance. The people who cater are not so greatly responsible as those who buy; if there were greater care and intelligence in the choice of foods, the purveyors would soon adapt themselves to the new needs. Nothing but the purest food will, however, pass without warning through the food-filter and the sentinels provided by the taste buds, if they are properly exercised.

The following case illustrates the danger of the suggestion of enthusiastic faith in expecting too rapid improvement to follow the adoption of the habit of poltophagy. A scientific man who was already taxing his powers almost beyond endurance was

so much impressed with the phenomena he observed in those practising poltophagy that he himself started immediately. For three weeks everything went well. He spent his renewed energy in doing still more work; he could not speak too enthusiastically of the amazing change in his fitness and power of work. At the end of three weeks he began to lose weight, though he could ill afford to do so; he lost his power of work, and did not recover for some eighteen months. This illustrates very well that when one throws the extra burden of regeneration on a body that is already geared up to its utmost degree of adaptation to excessive daily work, it is not at all unlikely to resent the change by stopping work with the most obvious hints.

We ought not to have the ideas and opinions of half a dozen or more people intervening between us and the food our bodies require, and when we have lost the power of the unfailing guides of appetite and taste, there is little difficulty in imag-

ining why it is that there are so many people with the incessant and ceaseless troubles of chronic disease. There should be no more excuse for slackness in such matters than there would be in carelessly running an engine. Every fact that concerns food and feeding should be approached in a calm, scientific spirit, without prejudices.

CHAPTER VI

DIRECTIONS FOR THE PRACTICE OF POLTOPHAGY

When a start at the practice of poltophagy is contemplated, it is well to remember how deliberately horses and many other animals habitually "chew" their food. Many men and women, to a varying degree, are poltophagists without being aware of it; they may only notice that they are somewhat slower in eating than other people. The next thing to remember is, that unless one had the necessary machinery for poltophagy, — nerves, muscles, bones, and teeth, — the process could not possibly be carried out. Not only is this apparatus present, but it has, in some degree, been in constant use — an entirely psomophagic man has not yet been met with. It must be remembered that nothing can be added to nature; that is to

say, the numberless complicated events which go to make up the phenomena of mastication and deglutition have been arranged in their order in the history of evolution. Such a process is only carried on to perfection when it is entirely natural and is hence unconscious. If the machinery has not been thoroughly used for some time, it is exceedingly probable that certain parts of it are out of gear. It may be the salivary glands, the muscles, or the nerves; whatever the fault in the apparatus is, it may be relied on to recover sooner or later with perseverance in using it as nature intends it to be used. Above all, the advice to go slow and not to hurry things cannot be repeated too often.

It is well to realise that the precise circumstances of any one day are never repeated even in the same individual; so that it is well to be prepared for frequent changes in appetite and taste. The great difficulty is to know exactly what one wants, and to get the purest food cooked

in the best way. If compromises have to be made, — and they generally have to be, — care must be taken not to give more than is absolutely needful. Change for the good, to be good, had better be almost as slow as the onset of the inefficiency that is suffered from. It is well to remember, as Mr. Fletcher so wisely insists, that the events which occur in the mouth, the first three inches of the intestinal canal, are the only part of digestion over which we have any direct control; if the mouth treatment is satisfactory, and favourable mental state is maintained, the rest takes care of itself. There are several plans which experience has shown are liable to be practised by persons who wish to reform their habits of eating, and these methods it is necessary to discuss.

(1) *By counting the Number of Mastications.* A certain amount of interest has been taken in the number of mastications it takes in order to dispose of a mouthful of food. Mr. Fletcher has voluminous record of his observations in this regard.

It shows remarkable variations even in the case of the same individual and depends on many causes. A kangaroo will give over eighty business-like mastications to a mouthful of bread. In the case of a patient who digested bread with difficulty over one hundred and fifty mastications were usually necessary. Mr. Gladstone, it must be remembered, attributed his strength and endurance to masticating his food, it was said, thirty to thirty-five times; as a matter of fact, when an interested inquirer counted the number of the great statesman's jaw movements in connection with each mouthful, from the strangers' gallery at a public dinner at Cambridge, he found the number was usually as many as sixty or seventy. It would seem, therefore, that Mr. Gladstone had only made a rough estimate, and showed his habitual wisdom by not counting his mastications. In the practice of poltophagic eating, some foods are sucked up by the selective apparatus at the back of the mouth before half a

dozen jaw movements have taken place, whereas, sometimes, more than a hundred are necessary. Even in Mr. Gladstone's own case, often many more than his specified number were required, so that the Gladstone *dictum* can only be set down as approximate. There are numbers of people who, if they count their mastications, are so literal and conscientious in following directions that they make their lives a burden to themselves and their fellows. Others, on the contrary, may be helped by it. In nervous cases it is usually harmful to direct too much attention to automatic acts.

(2) *By Hyper-mastication.* That is to say, conscious retention of the food in the mouth for too long a time. This is effected by pressing the hinder part of the tongue against the hard palate. The objections to this process are that it tends to interfere with the natural series of events, and may possibly cause a habit which will be difficult to eradicate. It must be remembered that one of those

admirable adaptations which poltophagy reveals is the fact that when it is attempted to digest starch artificially, it is found that the process is entirely interrupted as soon as sugar is manufactured by the ferment. This is called inhibition of the ferment action, and it is invariable in the case of the other ferments. Now the remarkable process disclosed in poltophagy provides to perfection that food-filter which Mr. Fletcher describes. It at once allows the soluble parts of the mixture which is being treated, and which has become sufficiently insalivated to be acceptable to the body, to pass out of the mouth through the lock-gates, so that all the starch should be subjected to the action of the saliva until the gates to the filter open of their own accord.

A useful process for beginners is to take one or two teaspoonfuls of flaked wheat or other very dry food at the commencement of meals, until the machinery gets into working order. The really important thing to remember is

that it is necessary to restrain the tongue from pushing the food backwards against the soft palate, or perhaps it would be more accurate to say, against the hinder part of the hard or bony palate. When this is prevented, the poltophagic apparatus acts normally. There is one exception to this, and that is when the soft palate is used voluntarily to suck the food from the front of the mouth ; this is not so bad as bolting the food, for it does not draw in lumpy food, but is the next thing to it. As long, then, as the process is, as it were, left to itself, it will gradually develop the fully co-ordinated action of the muscles, nerves, glands, etc., which are concerned in the process ; although there are no complete data at present, there seem to be reasons why it should take a considerable time in some cases. It is interesting to remember that poltophagic mastication cannot take place unless the mouth is closed. It is curious that the universally-condemned habit of eating with the mouth open should be evidence of psomophagy.

The Choice of Food by Appetite, etc.

It will be obvious to those who have read the remarks on body-habits and suggestion, that the choice of the most suitable food is by no means so easy a proposition as it sounds. It will be convenient if the ideal state, so far as present experience goes, is briefly noted. It must be remembered that in an early stage of such a revolution in ideas as this reform involves, with the necessarily short experience in its practice, the hints that are advanced are rather in the nature of suggestions than descriptions of well-ascertained facts. To be absolutely thorough, it would be wiser to prepare one's own food, but to the many this is not easily possible. When it is proposed to adopt the habit of careful poltophagy in the case of chronic disease, it is essential that the individual should place himself under as advantageous conditions as possible respecting climate, and above all as regards food. It would be of problematical value

to be in an excellent climate, where, for instance, there was bad butter. The most essential condition is the possibility of complete rest. Sun, fresh air, especially mountain air in the summer, exercise, freedom from worry, amusement, music, etc., are all useful, some even necessary.

The main thing is to take the regenerative process as seriously as possible, and to compromise as little as one can help. There should be great patience; the idea of immediate or miraculous "cure" should be replaced by a conception of the slow and certain healing power of nature when the environment is ideal. Nothing should be forced; any proceedings designed to hasten matters are more often than not the cause of mere temporary stimulation, and, on the whole, the cause of actual delay. With regard to the question of rest, it is necessary to realise that the perfection of rest is an absence of any kind of impulse travelling to the brain. On the other hand, it is well known that absorbing pleasure is frequently the most perfect

rest, and that people's harmless pleasures differ as much as they do themselves. There has been an extraordinary series of cures of extreme neurasthenia by Professor Déjérine of Paris, who does nothing more with these hitherto incurable cases than keep them in bed without talking and as free from the reception of impulses as possible, and feed them with milk.

It is well that any wish that patients should have for food should be gratified with as little disturbance as possible; nothing should be forbidden, unless there are the most clear and decided reasons against it. When it is remembered that all foods can be referred with little difficulty (or, by means of their prominent ingredient if they are composed of more than one variety) into one of the four groups mentioned above, the best device is to use a strong preference for a certain food as an indicator that will enable a better choice to be made in the same group. For instance, sardines, pâté-de-foie-gras, or cream-cheese may have sub-

stituted for them food fried in butter, — good fresh butter, — or cream in some acceptable form. Fresh fruit juices, salads, or vegetables when strongly craved may possibly have substituted for them a solution or soup of their salts. When starch is craved and causes acidity, dextrinised bread must be substituted for it. For cheese taken in the ordinary way it is better to have it finely grated and made into cheese sauce or straws, or else taken as Welsh rare-bit or toasted cheese; this makes the food more digestible and renders it sterile as well. Such devices as these will gradually enable those who are careful to be able to satisfy and interpret their preferences with greater accuracy and satisfaction, and at the same time to have increased pleasure in eating.

It is essential, while a patient is reacquiring his power of healthy discrimination in the choice of foods, that these should be as simple as possible, and that only one article of food should, as far as is practicable, be before him at a time. If there is a mixture of two or more

foods in one dish, it may be eaten in too large an amount, because of the strong and decided craving for one of the ingredients it contains. It is only natural that the neglect of such precautions tends to postpone the healthy state, when one knows definitely, and as decidedly as most poltophagic people do, what he prefers.

There is one warning which must be borne carefully in mind, and that is, that this epicurean system does not in any sense of the word imply asceticism. It is founded on the same plan as that most successful and practical doctrine of Epicurus, which was the scientific pursuit of healthy pleasure by the practice of as perfect an adaptation to our environment as our knowledge allows. So that in this interpretation there is no implication of seeking that so-called "enlightened pleasure of self-restraint," but it aims at the scientific recovery of the fullest possible exercise of the natural aptitudes and functions.

CHAPTER VII

THE PRINCIPLES OF FLETCHERISM

It is now essential to define what are the principles underlying what has been not inappropriately called Fletcherism. As previously intimated, it arose in the effort of a business man to apply business principles to the physiology of nutrition so as to correct his own malnutrition. In this he succeeded, and has preserved his life long after the insurance experts had refused to insure him. In the first place, one recognises a very decided difference between it and other "isms" on similar subjects. The difference is that it makes a claim which has never yet failed, — it appeals first, last, and always to nature and the science of nature. There is a demand made for a hearing for natural scientific adaptation, and such a claim cannot fail to be substantiated in the long run.

The business of science hitherto has been more to watch and understand nature than to direct it.

Fletcherism, then, boldly states, on the evidence of ample experimentation, that, if natural aptitudes are trusted, and the incomplete instructions and false teachings of degenerate habits are forgotten, there is little difficulty in maintaining health. In other words, it is stated that the primary and essential condition for scientific adaptation to environment is to secure natural environment including optimum nutrition.

To prevent this from being mere theory, Mr. Fletcher has had the singular distinction of bringing to light a fundamental human faculty to which he gave the business-like name of " Nature's Food Filter," and which had not been previously recognised by the organisations of medical science. The explanation of the fact that it should have been reserved for Mr. Fletcher to do this, and that it should not have been discovered by the researchers in the medical sciences, is readily seen.

The medical sciences can be said to be the crystallisation of the necessities of the sick man. The whole apparatus has been adapted to that end. It is in all probability due to this reason that there has been a partial, and therefore an inaccurate, conception of the protective physiological attributes of man. The sick man has been obliged of necessity to put himself more or less without reserve into the hands of his medical attendant, who suggests or orders what he should take, etc.

The professors of the medical sciences in all their manifold grades are little more than disease experts. The world has allocated the function of adjudicating and directing the conduct of health to the medical profession. This is natural, considering the magnificent services it has rendered to mankind. Physiology was good enough for doctors, and they retailed it, as taught to them, to their patients. In the general scheme of medicine the imperfections of this important branch were not conspicuous, because of

the lack of practice in humaniculture. It was then quite natural to think that the current Physiology was good enough for the world in general. So it has gone on in perfect good faith. Physiology has presented dogmatic decisions rather than a system of growing, active doctrine suitable for human purposes, and has gone on serenely about its business, which is the discovery of the general laws of life. So much is this the case that physiologists honestly think themselves capable of adjudicating on purely human questions, whereas in point of fact Mr. Fletcher has clearly and unmistakably shown that this World's Department for the Understanding of Man is out of gear and defective. In the first place, Physiology adjudicates on purely human questions without having had adequate practical working experience with human phenomena. It has missed the whole point of the natural requirement in the ingestion of food. Physiologists have only recently laid emphasis on the importance

of appetite; they did not know, or did not take into account, until recently that the dog has a very different mastication and deglutition apparatus from man. Their passively accepted dogma, the Voit standard of minimal nitrogen requirement for a healthy worker, has been proved to be grossly incorrect.

These questions must not be looked at as being in any sense of the word merely academical; far from it. A considerable part of the world has handed over the comprehension and direction of their natural defensive aptitudes to such faulty doctrines as these. They order their own lives by them as well as those of the soldiers, sailors, paupers, criminals, etc., not to speak of the instruction of the rising generation, that is given over to the direction of mere scholastic vanities. It is scholasticism which has claimed a knowledge greater than the evidence of the perfect defensive apparatus that nature has provided for all living creatures.

It will be seen, then, that Fletcherism

deals with conceptions that involve practical science, the working knowledge of every-day life for all human beings. This is in reality only a restricted view; in the broad, philosophical point of view it enters into the business of humaniculture, which now has all the resources of science, its trained observers and its knowledge, to carry it to a practical and logical conclusion.

It will be admitted by those who recognise that a case can be made out against the present methods and organisation of the medical sciences that it is of vital importance to throw light on the causes which underlie such a state of affairs. Physiologists have been engaged tirelessly and persistently, although by no means exclusively, in the investigation of the vital phenomena of those animals that can be most conveniently brought into a laboratory. There is no difficulty in seeing the reason, the object in experimental work being to have the factors under the best observation and control. This is plainly impossible in the case of man, as the

phenomena that can be accurately measured are few in number. Physiological chemistry, the means whereby the vital changes of metabolism are measured, is an almost new science; it is one of exceeding difficulty, that necessitates so long and thorough a training that there are few who are competent to hold the far too few and badly paid posts that are at the disposal of the laboratories. Then, as it is so new a science, a vast amount of work has to be done in purely scientific research and the perfection of its methods of measurement.

All the time, then, that science has been holding out dazzling hopes of the millennium, which seems to be as far off as ever, men and women are dying of evitable disease, millions are leading lives of inefficiency, and the apparent hopelessness of things is appalling humanity. At the same time a medically untrained individual makes a considerable discovery, even from a scientific point of view. The Greeks had hardly a vestige of the science

of which we are so rightly proud. Yet Greece was able to cultivate men and women who have been models of intelligence and physical beauty for all the generations since their time.

There are always two ways of "doing things": the first is to do what is desired first, and then to explain how it was done; the other way is to find out how first and do it afterwards. It would be difficult to say which method has been most fertile in results; it depends entirely on the subject to which the method is applied; but in the case of humaniculture, surely there can be no doubt, as there are necessarily human beings always with us in all stages of their development, that rather than wait we ought "to do" first, and use all the magnificent resources of science to improve our practice.

Hopes have been eagerly turned to the grand organisations of medicine for the wisdom that is to secure a more rapid progress of the world. Mr. Fletcher has demonstrated, it would appear, that in the

line of his special inquiry there is an evident reason for the want of output of the laboratories, — a lack of connection between detached details of knowledge. There is a vital necessity for a complete equipment in order to give man the knowledge needed to cope with his complex surroundings. Wild animals have this equipment assured them by hereditary aptitudes and training which enable them to avoid their enemies and obtain food. Without this knowledge of making the very best of things, or, in other words, of scientifically adapting themselves to their environment, the wild animals would certainly die. They must always be at "concert pitch," they must keep themselves in the "pink of condition," and must be ready at any moment to use all their resources and strength to escape from their enemies or to capture their prey. Therefore, other things being equal, the unfittest or weakest among animals are those who are least instructed and consequently unable to per-

fectly adapt themselves to their emergencies. Surely the lack of an equivalent instruction in the case of many unfortunate human beings is forgotten by those who say that "the unfit, the (so-called) have-to-be-bad, the criminal, the diseased, the mentally unsound, and the many other varieties of the degenerate, ought to be killed or allowed to die." It has actually been called the "foolish sentimentality of the age" that keeps them alive, to the world's detriment. Only a man as judicial and as experienced as Mr. Z. R. Brockway would be entitled to promulgate such an opinion as this, and he stoutly protests against any such discrediting of nature. He is another of those who do first and explain afterwards, instead of formulating pessimistic theories in the seclusion of studies and laboratories. In the place of the barbarous and uneconomical methods of punishment in common use he reformed criminals by using nature's method, both of growth and regeneration (*i. e.* growth

from degeneration), which is, to supply any needed instruction.

In a similar manner Dr. Barnardo took the most unpromising material (from an hereditary point of view) that could be imagined, and by means of instruction has been able to send an army of more than twenty thousand new citizens to Canada. Of these, ninety-eight per cent have done well. This is a result that one can recommend to those who are concerning themselves with the new science Eugenics; most universities would be proud of as much success.

Dr. and Mrs. J. H. Kellogg, of Battle Creek, in treating some forty adopted children, taken from most unfortunate early environment, during about nineteen years, have had no failures. Their waifs have been taken into their family life under their own roof and no feeling of "adoption" has been allowed to prevail. This would show an advantage in favour of family care as opposed to institutional care.

Another instance of "doing things" is afforded by Mr. Patterson, president of the National Cash Register Company of Dayton, Ohio, who, when he was investigating the partly known factors of manufacturing organisations, turned his attention to the development of the minds and bodies of his employees, and thus, by making full use of "human-wealth," made the remarkable success that is known all over the world. Many other instances could be quoted of the application of this principle of "doing things," but the preceding suffice for the purpose of illustration.

What does this distinction between "doing things" (action) and "thinking things" without the *reasonable* prediction of successful action really amount to? Practically these processes of induction, of deduction, and action are represented in the daily mental and physical activities of all human beings. The profession of thinking (philosophers), of thinking and measuring (men of science), and those

who "do things" (men of affairs or action) are part of the cosmic device for the division of labour. In point of fact these processes are inseparable from one another; perfect action is the end or proof of perfect induction or deduction, and is incontestably the goal of science.

The plan that is adopted by men of action, the plan that has been elaborated in the material progress of the United States, is known in Europe as the "American method." This device merits the distinction of being added to the well-tried philosophical processes of "induction" and "deduction," with the title of *production*. The first essential is to know clearly what is wanted, and then to keep it constantly in mind; whether it be that of the American nation to dig the Panama Canal, that of Mr. Rockefeller to acquire and distribute oil, or to organise an apparatus for acquiring and distributing the science of humaniculture, it makes no difference to the method that should be employed. It is necessary that the object

or end should possess the minds and govern the activities of the entire organisation to the exclusion of everything else, at any rate during business hours. This sounds an unnecessary thing to say, but in a practical business attempt at humaniculture there would not be either the time or the necessity to investigate the phenomena shown by the ganglia of the frog's heart, for instance, unless there was nothing more important on hand. The next step is to use that essential and important device the Card-Index System, or, as it might be called, the system of the automatic philosophy of men of action. Those who are masters of the device have, by its means, presented to their minds in an accessible and intelligible form the scheme of work necessary for the accomplishment of their purpose. In other words, one is able to appreciate what are the "cold facts" of the proposition. The factors that are contributory to the result to be attained by *production* are then carefully enumerated, they are next investigated in

the degree and order of their importance, and the knowledge that has already been acquired about them is arranged and classified for convenient reference. This once accomplished, the obstacles reveal themselves and have to be overcome. It can then be seen what requires the most concentrated effort. The importance of and the order in which the experiments are undertaken are judged solely in the degree that they will influence the success of the result that is aimed at, and for *no other reason* whatever. The modern motor-car was made first in a very crude form and improved by practice, without academic science helping any more than by the assurance that it "would not work." Edison "does things" first and explains them afterwards. In other words, his researches are not only for the purpose of measurement (induction) alone, but for production. Therefore, if anything is to be done in humaniculture, it must be done on Greek lines, or on "American business methods," which are classical in their prac-

ticality. It is not so much a question for individuals, but for the heads of great organisations and for a nation. Civilisation cannot be said to be run on the lines of practical humaniculture; one has only to contemplate the sorry crop of degenerates that form so prominent a feature of our large cities to realise its absence. There is no one person that is responsible for this lack of fundamental practicality more than another; we are all of us responsible. It is every one's business to see to it that concerted and co-operative humaniculture is started without delay, and carried through, not only with the philosophical processes of induction and deduction, but as well with the assured success of the American method of *production.*

Part Two

CHAPTER VIII

A BRIEF HISTORY OF THE ORIGIN OF MEDICAL DOCTRINES

THE origin and progress of the medical sciences have been due to the action of many forces. Like all other human organisations, these departments had their birth and growth in obedience to men's needs. The mother-force, it is clear, has been, and continues to be, the urgent need of the sick man to be cured of his disease. Patients have always been credulous and subject to suggestion, so that faith-cures of the most imposing dimensions and variety have been continually provided for them. Fortunately, as people have shown a growing predilection for the services of the Medical Profession, means have been provided for the slow and laborious acquisition of positive knowl-

edge at centres of learning. It must be borne in mind that an art such as Medicine, whatever may have been the poverty of its knowledge at the time of the emergency, has always been obliged to act immediately, so that its prominent feature has been that of a craft founded on a growing accumulation of practical experience in the treatment of disease. The sum of the practice agreed on by the majority has from time to time been organised under the domination of certain doctrines. These dominant ideals of practice can be conveniently grouped under the following heads:

(1) The Principles and Practice of Humaniculture. (Classical Greek.)

(2) The Acquisition of Positive Knowledge. (Science.)

(3) The Expectant or Natural Plan of Treatment. (Rational: Eclectic.)

(4) Empiricism, or the "Cure" Idea. (Orthodox.)

(5) Dogmatic and Scholastic Doctrines. (Schools.)

(6) The Ideals of Theocratic Medicine. (Faith Cures of many sorts.)

(1) *The Principles and Practice of Humaniculture*

It is interesting to record that in one direction at least the ancients excelled in the successful application of knowledge. Humaniculture, or the science of man's adaptation to his surroundings, can be said to have begun and to have ended with Greek civilisation. The predominant ideal in this as in other great national movements was closely associated with religion. The gods and goddesses of the Greeks were nothing more than conceptions of magnificent men and women. Their calm and settled belief in the grandeur and perfectibility of human nature was inborn and fostered by religious observances. Their daily life, too, was necessarily subordinated to these enlightened ideals. Humaniculture was with them an applied science in the highest sense of the word, and one that was carried out with the

active co-operation and close attention of the foremost citizens. The lives of the young were arranged so as to be an effective training for the great religious festivals, such as the Olympian games. The successful competitors received distinctions and many privileges, — one being to have their bodies sculptured so as to serve as permanent records of their feats and physical beauty. The Greeks, too, were practical psychologists. There were inspectors appointed for the object of censoring the tales that were told to the young, in order that no bad impressions should be imparted to them. Mothers were so keenly alive to the danger of harmful suggestions in youth, that they forbade their children associating with slaves and servants. Choral dances, music, literature, philosophy, rhetoric, gymnastics, etc., were the subjects of both religious and secular education. The poor received suitable technical education, as it was recognised to be important to have an early initiation into the chosen life-work. None of their

philosophers were too great to occupy themselves with the vital questions of education. Thus Aristotle condemned the laws that were promulgated to restrain children from shouting and making those noises that children still enjoy. Aristotle is universally acknowledged to be the greatest intellectual giant in the history of the world, yet he did not think it derogatory to point out that such restraint was in the highest degree injurious; that the exercise to the lungs was peculiarly beneficial; in short, that it was a kind of gymnastics, and by the last suggestion he touched the Greeks in their sensitive spot, gymnastics being looked on as religious exercises. They were also most careful in all questions of diet. It would be easy to extend this subject much further, but enough has been said to draw attention to the extraordinary success of their practice.

It is, however, necessary to refer briefly to the doctrines of Epicurus, and to note the fact that the present revival of the

interest in humaniculture under the name of Fletcherism is epicurean in tendency. Epicurus may be said to have been the first to formulate clearly the conceptions of the utmost simplicity in diet, a properly balanced nutrition, with mental calm and happiness. Above all, he realised and taught that health must be attained and maintained in order to secure the latter. Epicurus may be said to illustrate the peculiarly practical character of Greek philosophers; they practised what they preached, all of them taking the greatest interest in what we now call the commonplaces of life. They used all the resources of their highly cultivated reasoning and learning in the improvement of their practice. For instance, had the Greeks discovered the circulation of the blood, it is inconceivable that they would have been induced to make it the occasion of indiscriminate bleeding, as did a later civilisation. They would have been saved by their empirical and successful practice in humaniculture.

The sayings of Epicurus which have come down to us from various sources are most interesting and instructive, and decidedly worthy of repetition. "Nature ought to be the sole judge of what is conformable to nature." "Whenever nature acts without calculation and without reasoning, it cannot make a mistake; where there is no reasoning, there is no error; or, with all human beings the object that nature pursues is pleasure, there is here actually the natural object of life for all beings. It ought to be the highest aim of man; the latter will do by reflection what the animals do by instinct, — he will teach nature to lead his reason." "We ought," says Epicurus, "to be on our guard against any dishes which, though we may be eagerly desirous of them beforehand, yet leave no sense of gratitude behind them after we have enjoyed them." "Epicurus the Gargettian," writes another author, "cried aloud and said: 'To whom a little is not enough, nothing is enough. Give me a barley cake, and I am ready to

vie with Zeus in happiness.'" A great deal more might be written about Epicurus, who may be said to be, more than any other, the philosophical exponent of the ideals of the future; that future where the highest art and the most perfect science will be that of the development of man's faculties and aptitudes to a degree of which Greek civilisation will afford an indication instead of an unattainable ideal.

(2) *The Acquisition of Positive Knowledge*

The supreme value of positive knowledge is that it prevents the fruits of successful practice being lost. Humaniculture was born and grew under a heroic theocratic ideal into the fine flower of Greek civilisation, but in the dark days of the period before the Renaissance, the world sank to terrible depths under degrading theocratic tyranny that still exerts its sinister influence on some of the conceptions of modern life. If there had been more positive knowledge, it is unthinkable that all that was good in Greek

civilisation would have been lost during the Dark Ages.

The fine product of Greek intellect served as sufficient intellectual food for the world till the sixteenth century. In 1527 that erratic genius Paracelsus burnt before his astonished audience the almost sacred writings of Galen and Avicennus. Whatever may be said of his amazing character, he had the distinction of leading his contemporaries from the fogs of dogmatic authority to the daylight of observation and experiment. It is difficult to realise the protean activity of folly, ignorance, and authority in preventing the progress of the accumulation of positive knowledge. From Paracelsus onwards science grew by stages that were amazingly slow at first. For instance, the world paid for Harvey's great discovery by being bled for three hundred years. The increase of knowledge might be almost said to be insignificant till the scientific period of the world's history that commenced in the middle of the last century.

(3) *The Expectant or Natural Plan of Treatment*

It is far easier to act when swayed by imaginary fears, or when under the influence of systems or doctrines that suppress initiative and diminish responsibility, than to wait till careful and skilled observation shows that there is real need for action. The latter plan has at its foundation a trust in the innate tendency of the body to recover from the worst of its diseases when it has the necessary rest. Its basic idea has been to look on symptoms as the natural indications of the means that the body adopts in the course of recovery. These ideals have always numbered among their adherents the master minds of medicine. Hippocrates — the father of medicine as he is called — was the first hygienist. He wrote a treatise on the influence of environment on health and disease, his many travels enabling him to make a number of acute and valuable observations. He it was who first pointed out that the body was

not a system of warring republics, but that it was an entity where action was concurrent and co-operative, the affection of one part invariably communicating itself to others.

Asclepiades, a physician fresh from the famous school of Alexandria, introduced the enlightened ideals of Epicurus into medical practice in Rome. He founded a school of medicine whose practitioners were known as methodists. The theoretical foundation of their belief was that the body was composed of molecules in constant movement, illness resulting from a relaxation or retarding of this movement. Their practice, which, after all, is the important thing, consisted in making use of all the resources of an enlightened hygiene. They used massage, hydrotherapy, graduated exercises, and depended largely on a vegetable and fruit diet. They distrusted drugs because they involved the introduction of noxious substances into the body, thereby weakening the stomach and interfering with digestion, thus depriving the

body of its most potent means of recovery. Lucretius gave the help of his poetic genius to this school, which for generations afforded the ideals governing medical practice in Rome.

The change for the worse in later days is strikingly illustrated by the differences in the treatment of Augustus Cæsar and Louis XIV. After his expedition into Spain, Augustus Cæsar had an obstinate attack of inflammation of the liver which was treated by hot baths and sweating without success. He recovered when this treatment was changed to cold baths and an exclusively vegetable diet, especially lettuce. The success of this treatment made the reputation, we are told, of a young physician of twenty-five. Louis XIV., however, lived in more strenuous times. We are informed in a remarkable document, "The Diary of the Health of Louis XIV.," that in the short space of one year he took two hundred and fifteen different medicines, two hundred and twelve enemata, and that he was bled no

less than forty-seven times. A kindly historian would surely take such adverse circumstances into consideration when he gave his judicial opinions on the acts of such unfortunate monarchs.

The great name of Sydenham, one of the most prominent figures in the history of medicine, can be cited as another example of the reaction against ignorant interference and empiricism. Stahl too, the professor of medicine at Halle, wrote a book on "The Art of Healing by Expectation." The most picturesque of the opponents of interference was one Gedeon Harvey, the physician of Charles II. He waged an incessant warfare against his colleagues, even going so far as to classify them under the headings of their favourite remedies, "Iron," "Asses' Milk," "Quinine," "Mineral Waters," "Purgatives," "Bleeding." He spared no one, even recommending the substitution of the cook for the apothecary in his famous treatise on "The Vanity of the Philosophy of Medicine." He wrote the first book of popular medicine because

he thought that there was no reason that men should not prevent their diseases by domestic hygiene.

(4) *Empiricism, or the "Cure" Idea*

Empiricism can be defined as the use of the means of cure which have succeeded in similar or apparently similar cases. In its most favourable interpretation it can be looked on as the cradle of medicine, the accumulation of the experience of fellow-craftsmen. In ancient Egypt the ingenious physicians divided the body into a number of squares and regions, medical etiquette prescribing that none but the specialist practising in the particular square or region affected should be called in. The joy of these ancient practitioners in a case of acute rheumatism must have been subdued but acute. In old Rome it was customary to record any remarkable cure in the temples for future use. When a sufferer had survived a course of temple treatment, he was laid outside his door to solicit the advice of the passers-by. This

plan would be popular even now with the amateur physicians, who have substituted patent preparations for the temple prescriptions, and are always ready gratuitously to advise their suffering friends.

There are few things, from precious stones and metals to parts of animals, — the more out of the way the better, — that have not been laid under contribution for the attempted cure of disease. Polypharmacy, or, as an American picturesquely called it, "shot-gun prescriptions," was only abandoned a comparatively short time ago. In these days the profane and unbelieving look askance at the never-ending series of new drugs with unpronounceable names that are poured out and ground out by Teutonic industry.

Medicine has always provided an irresistible field for the activities of amateur physicians. One of the most interesting instances is the work written by Cato, the stern old Roman. He thought that cabbages were digested more easily than any other vegetable. They made a valuable

tonic in vinegar. If you want to eat or drink copiously when you are invited to dinner, Cato advises you to take some cabbage in vinegar beforehand. When you have finished your repast and you want to eat again, it is sufficient to take about five leaves to have the illusion that you have not eaten for twenty-four hours. Cabbage is just as good externally as internally, being useful for trouble of the heart, liver, teeth, eyes, lungs, colic, cancer, abscess, and nasal polypi. After this, one is not astonished to know that it is necessary to have considerable skill to make and administer the preparations that he gives in his book. Above all, it was necessary to remember to refrain from giving cabbages to slaves, — it made them eat too much.

(5) *Dogmatic and Scholastic Doctrines*

Doctrines in the medicinal sciences may be regarded as a kind of intellectual convenience. With the science of the past as a foundation, medical practitioners con-

structed the edifice of the day which remained till it was too small to house the newest contributions to positive knowledge. There is little doubt that they afforded some sort of discipline for the unthinking mind of the average mediæval physician, and might have rendered him a little less dangerous to the long-suffering patient. Doctrines have always started from a fixed point, an unquestioned and unquestionable idea. This fixed point was borrowed from tradition, revelation, conventional or arbitrary authority, or was based on some positive knowledge that often had nothing to do with the application that was made of it. The great disadvantage of such cramping ideals was that it was looked on as positively impious to question them. Thus Galen was able to construct a system from the science, etc., of the past which enjoyed an unquestioned authority that lasted for no less than fourteen centuries. Till the end of the seventeenth century no one was allowed to see anything without referring

to what Galen had seen, or to do anything without ascertaining whether Galen approved. The most wonderful example of the influence of suggestion on men's minds was the extraordinary effect of the discovery of the circulation of the blood by Harvey. This important and revolutionary discovery became the foundation of the really terrible doctrine of indiscriminate bleeding, under which, as before stated, mankind was treated for some three hundred years. In short, then, medical doctrines are an expression of that fundamental tendency of the human mind to come to some sort of agreement on any bases whatever, no matter how imperfect, and violently to persecute those who disagree with the accepted ideals.

(6) *The Ideals of Theocratic Medicine*

The practice of medicine, it is well known, has always been closely associated with the priesthood. One has only to recall the Egyptian and Grecian priests,

or to remember the sanitary laws and regulations of Moses who was trained by the Egyptian priesthood. The gratitude of patients and their keenness to recover their health provided so profitable an asset that there were many bitter fights to retain medicine as a priestly craft. It was their most valuable monopoly, so it is not to be wondered at that Esculapius himself was put to death for resuscitating an individual that the priests had pronounced to be defunct. To Hippocrates they were only scandalous, accusing him of robbing the temples of their prescriptions and then destroying them. The fundamental theories of theocratic ideals are two: the first, that disease is a punishment for disobedience to the gods, and the other more subtle and serious conception, that the body is evil, or that it is the evil envelope of the soul. The former idea served the useful and innocent purpose of keeping the faithful regular with their subscriptions. The latter on the contrary has been and is one of the most

widely and deeply harmful ideas that has martyrised humanity. Nothing but the vivid impression produced by a visit to the examples of pre-Renaissance art in the European galleries, can enable one to form an idea of the dire effects of this doctrine. There one finds an endless procession of starved, deformed, and anæmic figures showing more eloquently than words how far this pernicious notion had affected life and ideals. In this period our matter-of-fact ancestors showed how literal they were in the interpretation of the dominant doctrines. The patients were looked on as possessing wicked bodies that required punishment by way of treatment. They were starved, put into the dark, emptied of blood and filled with water: in short, they were treated with all the barbarities that perverted ingenuity could suggest. In the case of the Roman Catholic Church, dogma fought with every available weapon to impede the acquisition of positive knowledge. It assumed absolute authority over

men's minds. In those unhappy Middle Ages no one could think for himself unless his head was covered with a mitre. The aim of dogma was to dominate nature, thought, and freedom.

CHAPTER IX

THE APPARATUS OF THE MEDICAL SCIENCES

HOSPITALS and laboratories can be looked on as the apparatus devised by the practitioners of the medical sciences to carry on their work with the conveniences of association. They are the theatres of active progress in the acquisition and application of the positive knowledge of disease. It is most essential to examine their aims and constitution so as to discover which of the three branches of human biological research they are concerned with. At present the attention of the world is directed far too much towards hospitals that are clearly concerned with the third class of remedies, that of alleviation. Sanatoria are the commencements of the practical experience in the second class, regeneration.

Laboratories are primarily concerned with the research side of the alleviation of disease, and secondarily with research in the general phenomena of life that appertain to all three classes.

The Hospitals.

Hospitals are used primarily for the convenient treatment of the sick poor, and secondly to provide material for the education of medical students. They are also the theatre of the progress in the practical application of the medical sciences. There can be no doubt that they are the finest symbol of the enlightened and willing service of man that our civilisation affords. But the influence on thought of an habitual environment that is unhealthy, and an habitual intellectual exercise that is depressing, can be said to control almost completely the point of view from which general questions, such as regeneration and humaniculture, are approached. One must not forget in the contemplation of the dazzling progress of the medical sci-

ences that hospitals necessarily exert a strong pessimistic influence on the minds of medical officers who are the leaders of thought in the larger human questions. What does a medical man see in a hospital, and what is the nature of his work? The typical patient when admitted is washed, put into a clean nightshirt, and is seen in a bed that resembles other beds in everything else but its number. The patient really loses his individuality as a soldier does in the ranks. He is known while in the bed by his number, or he may be distinguished by his disease; so much so that a patient is always very proud of being a rare case. The close and careful attention it brings him is a comforting distinction in the ward. It is no more than a truism to say that medicine and surgery have been constructed from the phenomena presented by this patient in a bed. It may be said that the attention of the progressive minds and activities in medicine has been practically entirely confined to the study of diseases which are

the termination of whole series of unconsidered and unrecognised events that go to make up the tragic life-history of so many of our fellow creatures. The insidious commencements of disease, from the nature of things, are not present among the phenomena which it is the duty of the medical officers to observe and treat. This is also shown by the branches into which the medical sciences have naturally divided themselves. There is clinical medicine and surgery, the study of the phenomena seen at the bedside; surgery and therapeutics, all comprised under the term "treatment"; and pathology, the study of the phenomena presented by the dead body. In all of these there has been magnificent performance. They have all reached a high state of excellence that compares most favourably with any other branch of human activity.

But what is actually done for the study of the causation of disease? When the patient is admitted his evidence is taken as to his family history, his personal his-

tory, and the history of his disease. The evidence is that of an unskilled observer who can rarely associate events that connect his disease with its onset. Very few patients, it is well known in practice, can be depended on to give accurate information even about the beginnings of a tumour of the most evident dimensions. It is, however, this note-taking, inaccurate and unscientific as it must needs be, that is responsible for many of the preventive measures taken in the case of the more evident causes of disease that can be dealt with by legal means. The value of the statements of an unskilled observer who has, he knows not how, been defeated in the battle of life, cannot be of anything approaching the accuracy of the evidence that so important a subject requires. It may have been his work or his unhygienic home, or both, that are responsible. Whatever it is, it is naturally impossible for the physicians to have anything but the vaguest and most general ideas on the subject. Medical officers of hospitals,

then, cannot have experience and consequently the knowledge of either regeneration (the recovery of optimum health) or humaniculture (the science of the optimum adaptation to environment, which prevents disease). No one who is familiar with the hard work and unselfish lives led by the more active and influential members of the medical profession in hospitals will doubt that their exhausting and beneficent work absorbs their entire energies and leaves them little or no time for such questions.

The history of the treatment of consumption illustrates very well the result of the limited field of observation imposed by the necessary conditions of hospital practice. Patients were first of all treated in hospital wards; miles of notes were written in the usual painstaking way, recording the history of the patient and of his disease, together with the result of his treatment. A vast number of observations were made in the post-mortem room. We all know now that consumption ought

not to be treated in a closed ward or room, and that country air, etc., are necessary. It may be asked, "What is the present value of the extensive literature on the cure of consumption, of the work of doctors and nurses, of the lives that were lost or shortened through malpractice? Is it not more than possible that the same experience is being repeated with other diseases?"

The problem now has shifted its ground from how to cure a man in a bed in a hospital to the cure of a man in a bed in a sanatorium. The real problem still remains: how to prevent a man in a home from acquiring the disease? The reason for the delay in the recognition of the best means for the treatment of consumption was due to the limited scope for experiment possessed by the medical officers of hospitals. The question naturally occurs to one: how did it occur that the real facts were not pointed out to the public? This is due to the fact that the medical officers' views tend to be constricted by the nature

of their habitual occupation, which must be to devise the best means of treating patients in hospitals. Even if they had had more enlightened views there would not have been the evidence of successful practice to justify a sufficiently strong insistence on them. The revolution of thought that has resulted from the new ideas of consumption would certainly have occurred sooner if the activities of the medical officers had not been limited by the four walls of a hospital.

The defects of hospitals are to be found in the insufficiency of their resources; they are, in short, "the defects of the apparatus." They are alleviative in their scope, and lack opportunities in the experience and observation in the commencements of disease. Many important matters become administrative and subordinated to the necessities of wholesale treatment and popular prejudice. In the largest hospital in one of the capitals of Europe thirty or forty children between the ages of three and six were allowed beer *only* with their

midday repast, yet it is certain that not one of the medical officers of the staff would have defended such a practice.

Mr. Timothy Holmes, late Surgeon to St. George's Hospital in London, said truly that one of the most needful reforms in London was the necessity for the amalgamation of the dispensaries, workhouses, public health hospitals, and the general hospitals, so that they should all be readily available for purposes of study and teaching. He suggested that the general hospitals could act as consultative bodies to the other institutions. A plan such as this would be the only means that could give the wide scope for observation that the study of the causes of disease requires. Most disease is evitable; if there were wider scope for dealing with it at its roots and origins, the means for prevention would soon be devised. There are many patients admitted to hospitals at the present time as the result of a failure of the body to adapt itself to a faulty environment; the patient is too probably only

just sufficiently "cured" to enable him to have another "round" with his environment, to be defeated again and again, and to be patched up, till finally he dies and gives up a struggle, the end of which was assured from the start. There are many such cases as these under present circumstances which are nothing less than an avoidable charge on society, and on the work of the personnel of the hospitals. It is apt to become a sort of vicious circle that harms every one concerned. It is, however, inevitable so long as the problem is not dealt with as a whole. The question that will have to be decided sooner or later is whether disease, its prevention and its treatment, is not the concern and responsibility of the entire community. It must be obvious that when citizens are either inefficient or disabled, they are directly or indirectly a burden on society. It is, then, if this is granted, the business of society to see to it that all disease should be alleviated or prevented in the best possible way. This

cannot be attained unless the whole administration of health in its widest sense is the concern of the community and the medical officers are paid by the community. If poor-law, dispensary, workhouse, school, reformatory, prison, and asylum medical officers had better opportunities provided for research, and they were made the preliminary to higher appointments of eminence in the profession, progress in the science of the prevention of disease would be very rapid. No one who has held office in hospitals, and who has formed a part of those efficient machines for the treatment of the poor, can fail to be deeply impressed with their activity and power of doing more or less lasting good. It is impossible to conceive that their work should be curtailed in any way till there is a concerted attempt to deal with the commencements of disease.

The strained activities of hospitals have necessitated the allocation of research to specialists who have assumed the heavy responsibility of acquiring and testing the

utility and accuracy of facts acquired either by themselves or by their colleagues all over the world. The organisations have tended to become more and more international, as they are doing the same work and therefore have the same interests. It is becoming necessary to have some sort of clearing-house to prevent the almost inevitable overlapping and unnecessary repetition of experiment that occurs. At the present time this is secured by congresses and the publication of a large number of journals that are eagerly read by polyglot workers all over the world. In these days a new truth is passed through a crucible of criticism and check-experiment before it is passed on to the practising branches of the medical profession. The result of this has been that there are a number of principles of the first rank that have been almost insensibly absorbed into the body of accepted doctrine. In the absence of such organisations in the immediate past there would have been a history of bitter and strenuous fights which would have

rent the profession to its foundations. The subjects in which research is mainly conducted are pathology, bacteriology, and physiology.

The Laboratories of Pathology

This science concerns itself with the reactions of the body to the adverse influences causing disease. These effects have been carefully studied microscopically and with the naked eye. Attempts are made to explain the symptoms which clinical or practising physicians have observed in their examination of patients. It may be safely said that it is by means of this science that the most valuable results in the progress of the medical sciences have been obtained. A comparatively new branch of pathology is that of pathological chemistry, which is of the utmost importance, and promises to provide a rich harvest in the future by the discovery of the phenomena accompanying those errors of metabolism dependent upon tissue change that seems to show an unsuspected com-

munity in the origin of many of the common diseases. The difficulty of this department of pathology lies in the fact that few can attain to the thorough knowledge of chemistry that it necessitates, and that comparatively little work can be done by the competent few.

The Laboratories of Bacteriology

One of the glories of France is that her illustrious son Pasteur had the distinction of inaugurating a new epoch in the history of the medical sciences by the discovery of the influence of micro-organisms in the causation of disease. There has been no more triumphant demonstration of the vast and far-reaching influence of positive knowledge on ideas and practice. Before Pasteur and Lister, surgery was an art in its infancy, so that no one in his wildest dreams could have conceived the effects that have followed on the development of their research. It would be difficult even to guess at the number of valuable lives that have been saved from lingering

diseases or immediate death by these discoveries.

The researches into the causes of malaria that are so closely associated with the name of Major Ross have had a great and far-reaching effect. The heroic conduct of the American soldiers in offering themselves as volunteers for research into the causes of yellow fever was unique in the annals of military history, and enabled valuable work to be completed. The modern treatment of diphtheria, too, has saved many lives.

If there had been as fine a harvest of knowledge in the principles and practice of regeneration and humaniculture as there has been in bacteriology, knowledge of such value would have been acquired that the conditions of living would have been entirely changed. The origin of the zeal and effort that have been so freely and profitably expended in bacteriology has been primarily the desire to find cures for disease, but, as is frequently the case, it is an open question whether the con-

tributions to the positive knowledge of the phenomena of life will not prove to be of even greater importance. It has become almost popular knowledge to distinguish between the main factors in the action of microbes on the body, the character of the poison, and the properties of the soil in which it has been sown. The defensive properties of the body have provided against the invasion of micro-organisms a set of faculties that were quite unsuspected both in their singular efficacy and in their complexity. The researches that have been conducted in this fertile and remarkable field of knowledge will remain models of what research ought to be. It has brought a set of principles into the domain of positive science that cannot fail to have the greatest influence on the science of humaniculture when it takes its legitimate rank in the hierarchy of science.

The Laboratories of Physiology

The only one of the medical sciences that deals with the phenomena of life apart from disease is Physiology. This science aims to teach and to search into the phenomena of life in general and of human life in particular. In point of fact, however, almost the only definite instances in which any text-book on physiology deals with purely human physiology is where it is absolutely obliged to, as in the case of the special senses. It may be said that physiology acquires and distributes the science of the phenomena of life with very insignificant and unpractical references to the phenomena of the adaptation of human beings to their environment.

The science can be said to have originated in its modern form in the labours of Claude Bernard. When he gave his inaugural lecture, he is reported to have said, with a rare audacity, that "the scientific medicine I have to teach you does not exist," inferring that it would be

necessary for him to create it. His subsequent work bore out his claim. Both he and his master Majendie, who preceded him in his chair, conceived physiology as the pioneer and director of medicine. At the start of his work it was, above all, urgently necessary to clear away the wild dreams that were current among his contemporaries on the most elementary facts of physiology. This logically necessitated the herculean task to which he devoted his life. He always took the keenest interest in the history, philosophy, and progress of medicine. He held the highest and most lofty views of the destinies of the medical sciences, feeling clearly that the one great interest in life was human interest. The success of his work can be said to be startling. There was not a department in physiology that he did not illumine by his researches. His work was almost necessarily in laboratories.

No one would venture to question that there has been a magnificent production in physiology and that its work has shown

itself to be of the highest value; if, however, the highest aim of science is to discover the methods of the perfecting of man, it must be confessed that it has not adopted the most evident means to attain success.

Physiology can be said to have had allocated to it for exploitation one of the most important gold fields of human knowledge, and that it has been so hypnotised by the rich mine discovered by Claude Bernard that it has not moved from it. If there had been a systematic investigation of the whole field that is allotted to physiologists, it would be seen that there are more profitable outlets for energy than crushing the comparatively low-grade ore of mere laboratory investigation. For such knowledge is practically no more than the science of the material that can be brought into a laboratory. The reason for bringing forward these considerations is that in those questions that involve *practical* humaniculture, it is useless to look on physiology as being in any sense of the word the court of appeal for complete

information or even competent judgment. It is obviously not the business of physiology, neither has it had the experience necessary to adjudicate on such matters.

An interesting fact is that, so far as the author knows, there are only four physiologists concerned officially with physical development, — Dr. Anderson of Yale University; Dr. McCurdy of Springfield, Mass.; Dr. Storey of Leland Stanford University, California; and Dr. G. W. Fitz of Boston; all of them being Americans.[1] At Cambridge, England, there was formerly a blacksmith who enjoyed a considerable reputation as a trainer on the river; yet, though Cambridge University can be said to be the home of progressive physiology in England, no one evidently thought it worth while to make or record observations on such a subject. In the humaniculture days of Greece this was

[1] Mention should also be made of the following American medical men prominent in directing physical development: Drs. Sargent of Harvard, Meylan of Columbia, Reycroft of Chicago, McKenzie of Pennsylvania, Babbitt of Haverford, Hough of Simmons, Ward Crampton, and Bowen.

a duty that was thought to be a distinction by the greatest and ablest citizens.

No one would wish to see physiological research in any direction discontinued or the work of physiological laboratories curtailed in any way. On the contrary, unlimited support should be available for this neglected branch of science, for it deals with the motive power of mankind. If its services to humanity had only been to give scientific training to medical men the science would have amply justified its existence. It must be clearly borne in mind that work on the present lines is the only possible way where that control of circumstances can be obtained which, it is needless to point out, has proved itself essential for effective scientific experiment. Physiology must continue to be the trusted adviser of medicine, and ultimately provide the workers for certain branches of research as well as the scientific foundation for the science and art of humaniculture.

CHAPTER X

MODERN MEDICAL DOCTRINES

THERE is something grand and imposing in the history of the medical sciences. No other subject can give so many warnings of the faulty applications of knowledge, can show more rash and ill-reasoned action on inadequate information and hasty generalisations. On the other hand, no art has called out so many fine human qualities, such disinterested lives spent in the service of humanity, in the slow and painstaking work of the discovery of that positive knowledge which has had so extraordinary an influence on the progress of humanity. Numbers have sacrificed their lives willingly, not only in the direct service of the sick, where active sympathies are enlisted, but in the quiet and emotionless fields of scientific research.

Superstition and reason, quackery and orthodoxy, metaphysics and theocratics, wisdom and folly, observation and experiment, have in turn served to construct the foundations of the magnificent edifices of research and practice of modern times. The modern dominant ideals of the medical sciences are founded on the sure ground of clinical observation, pathology, and experimental research. It must not be forgotten that it is necessary to subject these ideals to the most jealous scrutiny and the closest criticism, for in matters that affect human betterment nothing but the best possible orientation of effort that can be conceived is satisfactory.

It is not unprofitable to reflect what would have been the effect on the arts of medicine and humaniculture if patients had paid for the prevention and not for the cure of disease. It is true that the vast collection of clinical and pathological material accumulated by modern work is the capital on which future progress will draw cheques that will never be dishon-

oured; and it is also necessary to recollect that notwithstanding the ills of plethoric luxury the amount of disease and suffering has been lessened to an amazing extent.

The main task of medicine in the future is to define and classify those states found on the frontiers of disease; in short, to measure the deviations from optimum health. From this, the discovery of the principles and practice of regeneration will lead on to the millennium, when social progress will be founded on progressive and scientific humaniculture. It is proposed to set out as clearly and as briefly as possible the present state of the medical sciences, and the indications that present themselves of the development of the ideals of humaniculture and regeneration.

As we have seen in the case of the doctrines dealing with human nature generally, they can be divided into the two classes, optimistic and pessimistic. The medical sciences, associated closely,

as they have always been, with human thought and affairs, have not escaped the influence of metaphysical conceptions. The pessimistic doctrines still survive and draw their gloomy satisfaction or dissatisfaction from their inheritance of the metaphysical dual theory and the theocratic conceptions of the innate evil of the human body. These dangerous ideals have, as we have seen, been mainly responsible for the martyrdom of man in the Middle Ages. They derived their philosophical support from the writings of Seneca, who, no doubt, was horrified by the consequences of Roman luxury. He initiated a revolt against the Hellenic ideals, which were in no way at fault, as they were never designed for the uses of the degenerate and self-indulgent. The soul, according to Seneca, was as much above the body as divinity is above matter. The body was a negligible factor, the mere earthly tenement of the tormented soul, in which it was never at rest. In the domain of the medical sciences there has

naturally been a great deal of speculation, but very little scientific inquiry into the early causation of intemperance, errors in diet, gluttony, etc. What could be more easy and natural than to adopt some variant of the pessimistic doctrines as an explanation, such as the incurable stupidity of human nature, and the like. "Civilisation," said Bichat, "is nothing more than the environment which tends to destroy human kind."

These doctrines have recently appeared in a new dress; scientifically speaking, the dual theory of human nature is out of date, and abandoned for a carping criticism of the human body and the common characteristics of the human mind. We have now a new type of philosopher, living and working in the seclusion of laboratories. It is a matter for congratulation that one of the most eminent of them, Professor Metchnikoff, has written a formidable book, with the comprehensive title "Human Nature." In this book, that has been translated into all languages and which has

gone out as the very latest and complete scientific conception of human nature, there is that misleading evidence of the most profound erudition applied to faulty doctrine. Gravely and reluctantly, with serious emphasis, we are bidden to review the most extensive researches into both literature and science to arraign poor human nature, and to find therein what the professor is pleased to call "disharmonies." To be able to appreciate his views it is necessary to learn the use of the professor's instrument, the mental microscope, — so very restricted is the field that he confines us to. That body which the Greeks cultivated, the intellect they developed with such great success, he takes to pieces and finds imperfect. Unlike most of the ancient pessimists, he is modern in that he has a remedy ; science that dwells in the haughty seclusion of its laboratories will help us. We are to be buoyed up with the hope that ultimately there will be a new scientific creation, a human body relieved of yards of

discordant intestine by surgeons and fortified by anti-toxins, living carefully, by the latest laws given out by the laboratories, on a diet of sour milk and curds, which curdled diet apparently pleases microbes as little as it does ordinary men and women.

The book commences with the not unappropriate statement that science has destroyed the foundations of religion and that it has left nothing in its place. There is some degree of truth in this statement, however, as science has not yet devoted itself to the perfecting of man. After extensive researches in the highways and byways of literature and science, the most incongruous guests are bidden to a feast to celebrate the imperfections of the human body. With the exception that certain human disharmonies are not found to be derived from the innate viciousness of microbes, it can be safely said that no possible count of the indictment has been omitted. The foundation of the indictment the professor rightly lays in inhar-

monic structure. The world has never been permanently the worse for pessimistic philosophers, but if any could show that there are structural deficiencies, there really would be something tangible and understandable in his criticisms of the human body. It is well known that in the animal kingdom the structural changes that accompany the development of new types are so gradual and slow as to be scarcely perceptible. In Anatomy it is found that there are a number of structures which are peculiarly subject to variations in different members of the same species. These structures are of two classes: the progressive variations characterising types, and the retrogressive comprising the organs that are tending to disappear, and that apparently serve no useful purpose, being merely inheritances from a previous type. Each of these retrogressive and progressive organs have the common quality of variation; they may be said to represent the future and the past in the evolution of the body, and are character-

istic of all animals. Though these variations can in no sense of the word be looked on as a peculiarly human characteristic, yet Professor Metchnikoff chooses to call them, in the case of the human body alone, disharmonies. The disharmonies that are important and noticeable, with the exception of some rather far-fetched gibes at the skin and wisdom teeth, are to be found in the large intestine and vermiform appendix. Here we have a disharmony that is useless, because as one woman lived thirty-seven years without a large intestine, therefore all the rest of the world is better without it. What would Bacon have thought of such an argument? The large intestine is bad, too, because ostriches and parrots are better without it; so, then, here is an additional reason that human beings do not want it. The mammals possess it, so that they need not stop in their headlong flight away from an enemy or after their prey, as the case may be, to drop their waste, but can wait for some convenient opportunity. For this

mammalian convenience and because of nature's defective ways, the whole of human nature is cursed with a considerable disharmony. It has been shown that the practice of poltophagy results in certain phenomena in the large intestines and in the characteristics of the waste which go far to attain the harmonies that Professor Metchnikoff requires.

It is claimed that positive science, proceeding from the simple to the complex, and from particular to general propositions, is now making an attempt to remedy man's organic disharmonies. It is perfectly true that medical science has gathered a wonderful harvest of the science of the effects of faulty adaptation; but, on the other hand, since the days of Greece it has played such a purely passive part in humaniculture that it has not even attempted to understand it. We are told that only science is capable of dealing with "inharmonious" man, and that we ought to rely on it when it is ready to pronounce its utterances. Why must we wait for the

medical sciences to proceed in their slow and laborious study of effects in hospitals and laboratories? Why not cut the Gordian knot and induce scientists to turn to the more profitable paths of observation in the field of causation and experiment on real human beings in real surroundings? Why take so much trouble with the study of pathological old age, when it is much more useful to produce physiological old age? Why not correct the so-called disharmonies by harmonious and scientific adaptation to surroundings? To formulate clearly the conceptions of regeneration and humaniculture, doing the best with the whole body as it is, intact, and capable of perfection as well as of degeneration, is the service we desire of science. If less attention is directed to the effects of unnecessary reactions to adverse factors in an environment, and more to harmonious environment, there will be less and less need to disturb ourselves about the structures in which nature chooses to manifest its degenerative and

retrogressive as well as its regenerative and progressive activities. It is difficult to conceive that the great discoverer of phagocytosis should not have been filled with respectful wonder at the new and marvellous power of defence and adaptation which he was the means of bringing to light, and that he should not have seen that he had the great distinction of adding yet another reason for holding anything but an attitude of carping criticism before nature's masterpiece.

The discoveries of Pasteur inaugurated a new era in the general conceptions of the medical sciences. He gave a mighty impetus to the study of causation; for the first time a number of the most terrible scourges of humanity were recognised to be due to the presence and activity of microbes. At first it was thought that the mere presence of the micro-organisms sufficed to produce the symptoms, but further research established a most important principle that has had a wide-spread influence in the comprehension of the

causation of other diseases. The actual physical effects causing the symptoms were clearly and unmistakably shown to be due to poisoning, or toxæmia, and that the poison was the consequence of the growth of the micro-organisms by the consumption of the contents and constituent elements of the body, which they convert by the chemical processes of their nutrition into fatal or dangerous poisons. It was then shown that there were entirely different effects produced in different individuals by the same dose of toxin or poison, or of micro-organisms. This led to the discovery of certain vital defensive apparatus that the body possessed against both the microbes and their poisons. The chemical reaction produced certain antidotes that were called anti-toxins; these substances were shown to be definite chemical bodies which could be isolated and kept so as to be used by other individuals attacked by similar poisons. This is the principle at the back of the anti-toxin treatment for diphtheria.

Two main factors of the problem were made prominent, the nature of the seed sown and the character of the soil in which it was sown; in other words, the virulence of the poison and the resistance that the body is able to offer. The resistance of the body, speaking generally, depends on the condition of health in which the individual is when the poison enters the body. It can be safely said that no subject has in so short a time rendered such wonderful service to humanity as bacteriology.

One of the results of the impetus given to the progress of the medical sciences by Pasteur was that vitally important principle of the toxicity of disease, — in other words, that disease is directly caused in most cases by toxins or poisons. These poisons, as we have seen in the case of microbic diseases, are derived from the organisms; they are exo-toxic, that is to say, derived from poisons outside the body. A remarkable and fundamental service has been rendered by another

great Frenchman, Professor Bouchard, who has the distinction of having demonstrated that the body is engaged in the manufacture of poisons both in health and in disease. The work he has undertaken has been long, difficult, and laborious; but it has been fruitful to an extent that is only beginning to be appreciated at its full value. Some of the most puzzling and troublesome diseases, from the point of view of causation, are those chronic maladies, such as gout, rheumatism, etc. They are not so dramatic and impressive as the microbic diseases, but they are apt to come early and stay till the end of life. The work of Professor Bouchard has been to group these diseases under a common cause, that of auto-toxæmia, or self-poisoning. If his work had stopped there, it would have been another instance of giving diseases a new name and leaving things as they were. But he defined a condition that he called "retarded nutrition," which can be looked on as the condition from whence a number of these diseases evolve.

The progress of this subtle enemy can be best understood by following an account of a common form of development of the trouble. The beginning of things is usually overwork or over-exercise, or the consequence of exposure to adverse surroundings. The individual becomes tired, there is no opportunity for rest. Perhaps the call for repose is met with stimulation in some form or other, such as alcohol, coffee, tea, or a large meal to "stoke up." The body is already tired, so that the fresh work thrown on it by the stimulating meal makes digestion peculiarly difficult and costly. Insidiously and almost unnoticed that formidable enemy dyspepsia installs itself. This may last for years, accompanied by acidity or not. The patient begins to be careful of his diet, such and such a beverage or food no longer suits him, he is no longer the man he was, he recalls that he is liable to be subject to "aristocratic" hereditary diseases. He may have a defective appetite, or he may be the sub-

ject of uncontrollable fierce dyspeptic hunger that is only satisfied by uncomfortable and dulling repletion. Together with these symptoms are found one or other of those manifestations of the most modern of diseases known as hysteria, neurasthenia, psychasthenia, and the many other forms of nervousness. Later on the sufferer begins to lose the acid character of his dyspepsia, — instead of over acidity or hyper-acidity, there is hypo-acidity or under acidity. In these cases there are present a number of complications that arise from the presence of intestinal fermentations from micro-organisms, which are continually introducing poisonous substances into the body. This throws unnecessary work on the liver and kidneys, which are probably already overtaxed. Then begins the period of various inflammations of the intestinal canal, one of the best known being appendicitis. Nervous symptoms become more prominent; there may be fits of bad temper, irritability, or suicidal depression. These

conditions are typically associated with the onset of the group of diseases characterised by "nutrition retardante." They are gout and goutiness, rheumatism, gravel, bile-stones, migraine, neuralgia, asthma, Bright's disease, obesity, diabetes, and diseases of the heart and arteries. This formidable list of diseases are for the first time associated together, and are practically certainly produced by the continual transgression of the laws of right living; in other words, the adverse factors greatly preponderate over the favourable factors of environment.

These diseases have been looked on as distinct in origin as in their pathological conditions; they are, in all probability, nothing more than branches from the same trunk. The main errors of hygiene are excessive work when rest is required, and above all excessive and hurried eating, with excess of alcohol and other stimulants. One can see, then, that in this important French school there is a strong note of hopefulness. It is classifying dis-

ease, and tracing it to its common origin in the unscientific adaptation to environment. Just as we have seen that the important adverse factor in the microbic diseases was the state of health of the subject, so we find that the time to cure chronic diseases is before they begin to show themselves in their distinctive forms. The explanations of the causation of these two large groups are approaching the same problem from different standpoints; each can be said to be asking the question, "What is health? how is it attained and maintained?" These new ideals are being admirably supported by Professor Bouchard, who said: "We live in an epoch where our doctrine will be renewed, not so much in matters of detail, but in the fundamental notions of the science, and the domain of science will become enlarged."

The following quotations from a paper by Dr. Mott, F. R. S., show that this distinguished authority looks on toxæmia as being one of the great causes of nervous

diseases: "There are a great number of functional and organic diseases of the nervous system in which poisons circulating in the blood act as contributory, predisposing, or exciting causes to persons with a neuropathic or psychopathic heredity, also to persons who have subjected their nervous systems to excessive functional activity or stress." "These three factors, toxæmia, stress, and hereditary neurosis or psychosis, combine to form a vicious circle in a majority of cases, — a vicious circle that is continually extending its limits, and which can only be broken by the removal of one or more of the three factors. Obviously in individuals only the first two are capable of withdrawal." There is no peril that so impresses itself on the imagination as the peril of lunacy and mental diseases, and there is nothing that is causing greater anxiety generally than the large increase of lunacy in recent times. There are, indeed, good grounds for the opinion that in this scourge, as well as in the case of

other groups of disease, the primary cause is an ignorance of the science of adaptation to environment.

There are, then, to be found many grounds for the confident hope that at last the medical sciences will find themselves in the position of having a definite orientation of thought and action towards the discovery of the means of the prevention of disease, and that there is a strong tendency to go over the old ground so as to dot the *i*'s and cross the *t*'s, as it were, after the hard-won success in so many fields of research. This view receives support from the address delivered this year (1905) to the British Medical Association by Dr. Maudsley, the President of the Section of Medicine: "Looking out on the present state and prospect of medicine, it is obvious that its future work will be mainly to prevent and stop the beginning of disease — to take good order that it shall not come, and if it do come, to prevent functional disorder from lapsing into fixed disease, which must be

given over either to the surgeon's knife or to the shears of Atropos; for to despise the little things of functional disorder is to fall by little and little into organic disease." "In the work of fortifying the body to resist the encroachments of disease, the most simple means are the best, and, as Hippocrates said, it is in the use of simple means that great physicians especially differ from others. Pure air, clean and proper food, regular and adapted exercise, — these sum up the measures prescribed as proper to give it inward strength, and to keep it in sound and supple activity. But they are not all, for they leave out mind; and as a sound body is the condition of a sound mind, so the wholesome exercise of a calm and well-disciplined mind, ready to meet all changes with composure, ministers mightily to health of body."

"If mankind is to be perfected, the means of perfecting it must be sought in the medical sciences. For my part I cannot doubt that a positive science of human

nature, as it gradually emerges into form, will make it ever more and more plain that, by operation of natural law in the process of evolution, sound thought, good moral feeling, and devotion to a high ideal are the solid foundation of health and wealth of mind in individuals, in families, and through families in nations."

Such an address as this is a sign of the times, and it is more than justified by the amazing improvement in conditions that are consequent on the solid and valuable contributions to positive science during the last two decades, that bid fair to revolutionise life as soon as the treatment and recognition of those manifold conditions at the frontiers of disease are not only fully understood, but treated thoroughly by regeneration.

The object of Part II. has been to ascertain whether there is a justification for the views expressed in Part I.:

(1) In the history of the genesis and growth of medical doctrines.

(2) In the constitution, activities, and

effects of hospitals and laboratories, especially with reference to their influence on thought.

(3) To see whether there is any tendency in the latest expression of modern medical doctrines of an orientation towards the adoption of the principles and practice of humaniculture.

In the first chapter, in far too brief a manner, it is endeavoured to bring out the essential similarity, or rather the continuity, of ancient and modern dominating ideals in medicine. These ideals, then, have not disappeared, but they have become most profoundly modified by practice and the acquisition of that positive, permanent knowledge that is obtained by *production*. In these days faith cures are called suggestion and hypnotism, though at the same time we have, as it is well known, theocratic and other forms still with us. The expectant plan of treatment in these days is in high favour, more so than at any time in history; empiricism, too, rendered more intelligent and subjected to

continual improvements, remains, fortunately, the trusted guide of practitioners; the "cure idea" is popular, as one can see by the study of last year's forgotten novelties in the drug-lists, or of the patent medicines in the advertisements.

Enough has been said to identify the character of the apparatus and the doctrines of physicians throughout history, not only with the dominating ideals current among the people, but with their requirements. This is well illustrated in the humaniculture days of Greece. It was a time free from deforming ideals; in point of fact, the mental speculative conceptions coincided very closely with successful practice. In other words, the essential conceptions, both religious and philosophical, as well as the practical philosophy, of every-day life were harmonised, progressive, and therefore effective. Optimum health, or, at any rate, a sufficiently close approximation to it, has been attained and maintained by the continued test of action in physical exercise; such as,

for instance, in the case of the hardships of the Roman soldiers recounted by Julius Cæsar. So soon, however, as men began to settle in towns and cities, an easier and insidious environment was substituted for the rugged tests of war; there was no longer such need to keep in fighting trim; nature, sphinx-like, then propounded a new question, — how to make use of the supreme gift of reason for the scientific adaptation to the new environment. This question has not yet been answered, and daily, hourly, the penalty of the fabled sphinx is being paid all over the world.

In the history of religions, where medicine was born, it is found that they are closely associated with practical, sensible laws for the conduct of life, though not in such a high degree of excellence as in Grecian mythology. It is easy to think of the Egyptian priest-doctors, with a pitying smile for the credulity of their patients; but, on the other hand, Moses was educated by them, and thus was able to embody their excellent hygienic laws

with the ritual of the Jewish religion. Mahomet was closely familiar with the marked differences between the desert Bedouins and the inhabitants of the towns in Arabia, and thus was able to embody certain hygienic religious observances that have since proved invaluable. There are those who wonder at the vitality and endurance of the Salvation Army; their wonder would cease if they read a book written by General Booth entitled "Religion for every Day." There are chapters on clothes, sleep, personal cleanliness, sickness, and hints on health and water treatment. Nothing explains the success of the Army better than the common sense and excellent counsels found in the book. The following quotation is chosen at random: "A man's food has much to do with the exercise of his gifts. It affects his ability to sing, to pray, to reason, to talk, to lead. A hearty meal of the plainest fare, or a very small quantity of richer food, will often clothe my soul with torpor, make my brain feel like a log of

wood, and render speaking or writing a positive torture." No more need be said than that the book is full of such practical direct counsel. This year two significant events occurred in Rome: a copy of the shrine at Lourdes was erected in the gardens of the Vatican; the Pope received the gymnastic societies of Italy and other countries with marks of the highest favour. The observation can be made without any disrespect that His Holiness and the Cardinals habitually make use of the best medical talent available. These three instances illustrate the principles of faith cure, humaniculture, and orthodox medicine.

A great difference is noted between the ways of the profession of engineering and those of the medical sciences. It would not be questioned that the "physiology" of engineering is scientific physics, which, like human physiology, confines its activities to laboratories. No one would be more astounded than Professor Thompson if he were asked to act as engineer,

or even to lay down laws for engineers' practical work, let us say on a man-of-war. On the other hand, it is most unquestionably laboratory physics that has been responsible for the immense progress in that department of human activity.

Medical laboratory scientists have had just as great an influence on practice and ideas as have the physical scientists. In the same way that it would not be in the slightest degree derogatory to doubt the ability of Professor Thompson to act as engineer, one can effectively criticise the incursion of physiologists and bacteriologists from the realms of observation and measurement into that of *production*. One might carry this parallel still further by doubting the ability of a captain of a man-of-war to handle a ferry-boat, or that of a famous physician to take charge of the education of a school in humaniculture. As long as physiologists have not conspicuous success in attaining and maintaining more than average health them-

selves, it is legitimate to say with the old proverb that "among the blind the one-eyed man is king," and to hope that the time is not far distant when none must necessarily be blind or even one-eyed.

In answer to the question as to whether there is evidence of an orientation towards the principles of humaniculture in modern medical doctrines, all will admit that there is abundant evidence that medical doctrines are undergoing profound changes. This is sufficiently well shown by the quotations from Professor Bouchard, Drs. Mott and Maudsley, the address of Sir F. Treves, etc. The reason is that a prodigious amount of work has been done in many directions, and as the work has all been done on man for man, the most urgent and dramatic diseases have been robbed of their terrors, and it is only natural that interest should have shifted to the origin of the more difficult chronic diseases, and to those minor ailments that Professor Héricourt so well calls "Les Frontières de la Maladie." To sum up,

then, all evidence leads irresistibly to the conclusion that the cause of most troubles, the root and trunk of the vast spreading tree of disease, lies in the absence of business-like humaniculture.

Part Three

CHAPTER XI

PRIVATE HUMANICULTURE

It has been said that intemperate enthusiasm and certain other circumstances have induced those who are interested in Fletcherism to make claims for its success which its importance does not justify; in short, to exaggerate its value. To understand its peculiar importance it is necessary to define what is meant by "humaniculture." Looked at from the simplest point of view, a child is an organism that develops by virtue of the reaction of its body to its environment. The body is able to react to its environment by virtue of certain aptitudes and qualities that characterise all human beings. It is obvious that the factors to which each body is exposed are either adverse

or favourable to the development of the organism.

These factors can be divided into three classes:

(1) *The Respiratory Group.* These factors are naturally of vital importance, as we breathe on an average about twenty times a minute. They comprise all the external circumstances modifying the respiratory apparatus, the muscles, lungs, etc.

(2) *The Digestive Group.* These factors are second in order of importance. As food and drink are usually taken in daily, it is necessary that their quality and quantity should be as nearly as possible those actually required by the body. These factors involve the ingestion of food, such as mastication and insalivation, that are influenced by taste and appetite.

(3) *The Group of Factors, guided by Intelligence, including the Physical and Mental Education of the Body.* Education is of two kinds: (*a*) Those subjects that appertain to humaniculture in its relation to the fundamental aptitudes of respiration

and digestion. It includes, in short, all those subjects that are necessary for the entire science, for the optimum adaptation to environment. (*b*) The ordinary physical education on scientific lines, with the development of the mind by education controlled by psychological reasoning.

When human development is looked at from these three essential standpoints, it is clear that, in the case of the respiratory group of factors, all those marked and valuable changes which have been instituted through the reform in the treatment of phthisis by open-air methods have arisen in consequence of the more thorough comprehension of these vitally essential factors for the best conduct of life. It has been shown abundantly, in the case of the second group, concerned with digestion, that the tendency of scientific opinion is decidedly to realise that the root-causes of a number of diseases, both mental and physical, are derived from the occurrence of adverse factors directly or indirectly concerned with digestion. The

reason then that Mr. Fletcher's discovery is of such exceptional importance is that it deals with the essential and fundamental science of digestion. It is for this reason that it is a considerable contribution to humaniculture. Being as it is, therefore, a root-factor or root-question of life, the points raised by its discovery involve so many subjects and cover so wide a field, that it is obvious at present that only the surface of its relationship with other phenomena can be dealt with. It is well to repeat that this book does not attempt to do more than indicate suggestions for research, experiment, and practice.

The greatest service that can be rendered by those who are interested in altruistic work is the discovery of truth in the phenomena of life which can be generally applied to the practical purposes of humaniculture. For the business-like acquisition and distribution of knowledge it is necessary to create an apparatus such as the medical sciences, which is admirably adapted to the purpose. We have seen

that it has laboratories for scientific research, hospitals for the testing and application of science, and, finally, medical practitioners to serve as links between the higher organisations and the ordinary citizen. This organisation has grown to its present state by the labours and experience of many generations; the character of its growth has been due to the expression of the enlightened needs of the public, and affords an example of the exceedingly efficient way in which the medical profession has met new wants.

All progress that depends on the acquisition and distribution of knowledge is sane, slow, and assured. Anything violent or revolutionary, that seems to necessitate the adoption of fixed rules of conduct before knowledge justifies them, with many agitations and bothers, is bound to defeat its own object. The knowledge which it is necessary to possess for emergencies and for decisions involving compromise, in order to neutralise as well as possible the adverse factors

which are imposed on those obliged to earn their living under modern conditions, necessitates the co-operation of skilled experts.

It is clear, then, that the first thing to do is to acquire knowledge as soon as possible of the most positive and unmistakable form. This can only be attained by making use of those trained in the scientific methods of the medical sciences. In the same way that the medical sciences have grown and adapted themselves to new needs by new methods and new skill, so they will adapt themselves, if there is a need for their services, in regeneration and humaniculture.

Dr. Maudsley in his address to the British Medical Association in 1905 said: "For the adoption of the necessary measures to ward off disease and nip it in the bud, the medical man does not get full and fair opportunities. Summoned to the bedside of one actually ill, the disease having got its hold, he sees the sick man for the first time when, being sick, he is

not his true self. Ignorant, therefore, of the patient's constitution and habits, of his temper of body and mind, — all which count for much in the prescribing of sound rules and directions, — he is not qualified to counsel wisely as if he possessed the necessary elements of comparison between the sound and unsound man to instruct treatment." This last statement confirms the suggestion that a partial view is necessarily obtained of patients in a hospital. It would be inaccurate to look on the medical profession otherwise than in the light of people who have stored certain wares which they know they can sell. The public want and pay for disease experts; so they are supplied. As soon as there is a want for those learned in the principles and practice of regeneration and humaniculture, the medical profession will provide them. Success and conspicuous personal good-health will soon distinguish the successful health doctor.

In a very remarkable and suggestive

book by Professor Héricourt of Paris, published in 1904, with the appropriate title of "Les Frontières de la Maladie," or the beginnings of disease, he shows most clearly and scientifically how what he calls the fixed and more or less incurable forms of disease are preceded by curable conditions or stages during which matters can be set right comparatively easily. It is nearly always in consequence of readily ascertainable and common-place primary events that the organism ultimately succumbs to the serious condition of disease. Disease is generally an indication that the body has given up the struggle because of the extensive changes that have taken place in consequence of its persistent reaction to adverse factors; it means, in short, that the disease has won the fight. He points out that one often hears people saying: "What an odd profession yours is. You live on the troubles of other people; the more people that are ill the more pleased you are." When one asks a doctor whether he is

doing well, "plenty of work" means that there is plenty of disease. It would clearly be an eminently practical reform to make it to the doctor's interest to rejoice in the freedom of his clientèle from illnesses.

This reform would occur almost without notice by the modification of the duties of the general practitioner, who, at the present time, has the most intimate knowledge of the home life of his patients. He is the chosen and often life-long friend of the family, and is sometimes consulted by anxious parents for very small matters. He is frequently called in for the decision of those anxious questions that involve the choice of the life-work of children. Among his brethren the intimate, family doctor-adviser will by far be the nearest to realise the ideal physician of the future. The eminent consultant knows little or nothing of his patient's surroundings and life except from the observations of the general practitioner who calls him to advise in grave emergencies. He, and

those specialists who are concerned with some restricted department of disease, are clearly typical disease experts, rather than *health* experts.

If there were a sufficient number of people who contracted with their doctors, by means of an annual payment, to advise them how to conduct their lives so as to avoid disease and to be as efficient as possible, it would enable them to have the necessary leisure to deal with the new problems that would be offered for solution. One certain and incontrovertible fact brought out in the recent history of the medical sciences is the speedy way that the most difficult problems are solved by the extensive co-operation in work that characterises the present organisation of the sciences. It must be remembered that in sociology as in biology the function preserves and develops the organ. This is well illustrated by the extraordinary development of dentistry in recent times. Diseases of the teeth, of modern origin, have led to the develop-

ment of a wonder among the exact sciences. If the kidneys and liver were as accessible as the teeth, humaniculture would have made a new world for us before this. If there was payment provided for health experts, the present medical practitioners would soon devote their attention to the study of those all-important minor ailments that occur in the early and curable stages of disease, and it would not take long before the most prosperous and useful members of the profession would be as expert at the prevention of disease as dentists are in saving teeth.

There is a decided indication of a growing demand for the profitable services of medical men, too, in the financial interests of employers of labour. An interesting experiment was carried out about thirty-six kilometers from Paris in a mill where there were employed forty-four men and seventy-five women and children. The medical officer of the mill first saw to the sanitary appliances and regulations, giving

careful instruction and explanations. He gave some twelve practical instruction classes to the mothers that lasted three or four hours each; these lessons were on diet and cooking, with cleanliness, the way to take body temperatures, and how to look at the children's throats. This experiment was entirely successful, though the doctor lived in Paris. There was not a single death in three years. There were one or two cases of scarlet fever and diphtheria that were promptly and effectively isolated. The men workers were allowed two hours' rest in the middle of the day, and the women two and one half hours, so that they could prepare the food. Each employee was entitled to fifteen days' holiday at full pay in the year. Alcoholism was unknown; most of the workmen became total abstainers. The regulations were adopted in consequence of the suggestions of the doctor, who acted as arbitrator in the interests alike of the employer and of the workers. This experiment was not philanthropic but finan-

cial, the employer realising that he had better value in work from healthy hands.

Similar results on a much larger scale have been obtained by Mr. Patterson of Dayton, Ohio, and by Messrs. Cadbury and Lever in England, as well as in many other instances too numerous to mention. As soon as manufacturers thoroughly realise that there is money to be made by seeing to it that their workers are healthy and efficient, there will be as much competition in "welfare work" as there is now in having the latest machinery. If this were desired by employers there would be no lack of competent medical men who would be able to satisfy the requirements.

The ideal state of humaniculture will be attained when every man, woman, and child possess the knowledge that will enable them to attain and maintain their optimum efficiency; it is scarcely necessary to say that such an ideal is very far off unless there is general and even national co-operation. To carry out this

ideal, it is necessary to acquire and distribute as much positive knowledge as possible. These ends can be best secured by the payment for research and instruction in humaniculture and by the establishment of laboratories and professorships at the universities. Short of these larger aims it is certain that the discovery of truth in any form through the practice of private humaniculture, provided always that it is properly applied, is advantageous to the individual and the world in general.

The distribution of knowledge for practical application is the easier of the two desiderata, and one that could be well carried out by the formation of associations for the study of humaniculture that would exchange experiences, encourage discussions, and pay for lecturers. It is obvious that the end of humaniculture is education, with its basis in the knowledge of the necessary aptitudes of the body and mind, and instruction of a plain and unmistakable character in the care, use,

and development of the body. This subject is essentially a mothers' subject first of all, and one that Mr. Fletcher saw clearly was, as he expressed it, "foundation and not steeple work," in his favourite scheme of Social Quarantine. The honourable professions of the future will surely be the seekers and the teachers of truth, researchers and distributors who will enable the world, which has waited so long, to realise its final and supreme mission, the science of the perfection of man.

CHAPTER XII

HUMANICULTURE AND THE STATE

M. Solvay of Brussels, the well-known educational philanthropist, stated to the author that when he started in business he was able to forecast the present commercial development and progress, and by this means was able to make his large fortune. With his increased experience he is now more convinced than ever of the necessity for sociology being placed on the basis of the positive sciences, by the same methods that he has pursued in his business. If this is not done, the conditions to which society is proceeding will revolutionise the present state of affairs, and the world will find itself without a science of positive sociology for legislative reconstruction. He felt, at the time of the interview, that he was fast becoming an old man, and that nothing remained

for him to do but to "crystallise his ideas," as he expressed it, in some permanent form. He therefore founded first an Institute of Physiology, with the object of increasing men's basic efficiency, and next door to it an Institute of Sociology, to make, record, and organise observations on existing social phenomena from a positive point of view. Since then he has added a beautiful building to his monumental group in Parc Leopold to be used as a School of Commerce. He wished thus to intimate, as Comte pointed out, that the positive basis of Sociology was to be found in the application of the all-inclusive science of Human Physiology, or, as it is called here, Humaniculture.

Probably no statement would meet with less opposition than the general proposition that to understand a subject it is necessary first of all to acquaint one's self with its factors, or the subsidiary subjects that appertain to it. This opinion would be held with vehemence and in the strongest and most uncompromising way in a

question, let us say, of a locomotive or the construction of a bridge; in short, in the case of all positive subjects, especially those that are submitted to the test of superadded weight or action. On the other hand, in all those manifold subjects dealing with human phenomena such a statement would meet with doubts, fixed ideas, prejudices, doctrines, much discussion, a most insignificant basis of agreement, in fact, almost any one feels qualified to give and act on his opinion. Yet there are no subjects which are so complex, so difficult to understand, so full of pitfalls and errors. The foundation of the understanding of such subjects must clearly be the science of humaniculture, in the widest sense of the word, at all ages, in health, physical and mental education, disease, and degeneration. The only side of the phenomena of these subjects that we are taught to think necessitates skilled and expert opinions is in those cases that involve actual disease. If such scientific knowledge is necessary in disease, it is

surely infinitely more necessary in questions of education, reformatories, and crime. In this business-like and scientific age we are as unbusiness-like and as unscientific as we can possibly be in all those questions of regeneration and humaniculture, yet there are no subjects where the calm directing influence of positive knowledge is more needed. We all know more or less definitely that it is wanted, but there seem to be no concerted attempts to attain it.

It is proposed to show that a Department of Humaniculture is becoming more and more necessary for the conduct of modern government; the urgent questions calling for solution with greater and greater insistence are those social problems concerned with physical and mental education, crime, pauperism, and the unemployed. A government without a Department of Humaniculture is in the same position as that of a man without sufficient science to conduct his life. There is an urgent want for organised research and experiment

by governments to elucidate and remedy the great and growing ills of society. There are few members of the representative governing bodies who would allow themselves to direct operations in the manufacture of guns, but there would not be one of these legislators who would have any scruple against adjudicating and having the most decided opinion on any of the many questions involving human beings. Yet the latter points require wider and at the same time more specialised knowledge and deal with infinitely more difficult subjects. The result of this state of affairs is divided counsels, expensive and ill-conceived experiments, and a very insignificant degree of progress for the work involved. The wrong issues are constantly being submitted for adjudication leading to worse and worse confusion.

In a popular magazine published in England Mr. Arnold White writes on "The Waste of Charity." The article well illustrates the confusing and contradictory views which are widely held,

though not so frequently expressed with such uncompromising freedom as the following: "Our civilisation is largely run in the interests of invalids. Ill-health is almost universal among the women of the poorer classes in the great towns. Mothers work. Children are thus handicapped for life before they draw breath. When the child is born it is fed on artificial milks and foods. When it cries with pain it is soothed with patent drugs. Thus the boys and girls are anæmic and stunted undesirables, with bad teeth. We can continue the present system of nourishing and propagating lunatics, paupers, and criminals and of multiplying unemployables till about the year 1925. So far as human events can be ascertained before they happen, the survival of Great Britain as a great power is impossible after that date, if we continue our ghastly system of indiscriminate charity to the fit and unfit, to the vicious and the virtuous, to the guilty and the innocent. In view of these facts I have asked some eminent

physicians to answer a series of questions, of which the following is the last: 'In your opinion is it possible for the medical profession to speak out boldly on the subject of the breeding and degeneration of the people? And are the habits of hospital patients such as to render support of the hospitals an endowment of thriftlessness, undue consumption of drink, improvident marriage, and the manufacture of the unemployable? In other words, would not the destruction of every hospital in England sterilise a considerable portion of the undesirable element in our population?' In every case but one I have met with deep appreciation of the truth of the facts set forth, of the evils that require redressing, and the need for prompt action; but always coupled with the statement that the medical profession has nothing to do with the moral character, physical condition, or origin of the disease of the patient. Whole-hearted to the process of curing him, without reference to any other consideration whatso-

ever, is the only duty recognised by the medical profession. This is a noble ideal; but some, at all events, of the money given by generous subscribers to the hospitals is devoted, not to waste, but to the generation of vice and crime and to the perpetuation of sorrow. Statesmen stand by watching the contest between the battalions of diseased inheritors of misery and crime and the struggling army of the prudent and self-controlled. Where a man is criminal, pauperised, or diseased, he begets diseased, pauper, or criminal posterity. His children are handed on as burdens to posterity by the charity of our day. . . . Lunacy is galloping ahead, — one in two hundred and ninety-three of the total population is a lunatic. In 1859 only one in five hundred and thirty-six was a lunatic. But the officially known lunatics are to be supplemented by the lunatics uncounted by the State." This article shows the chaotic and curious views which are held on the subject of degeneration. The only remedy that is appar-

ently suggested is that hospitals should be abolished, a remedy that would be as practicable as hanging all brewers and publicans.

It is scarcely necessary to repeat the facts and figures of the different forms of degeneration; it is such common knowledge that now all admit it. The only difference is the attitude assumed towards it. There can be no question that such views as those expressed by Mr. Arnold White do great harm. They are widely held among the privileged classes; the poor who live cheek by jowl with actual or possible criminals, paupers, and the so-called thriftless know better; they are not able to express themselves in scientific phraseology, but, knowing more, they are nearer that state of knowledge where "tout savoir est tout pardonner." The lessons of despair, of hard, miserable, endless experience show them only too clearly that drink, pauperism, thriftlessness, crime, disease, and death are the inevitable consequences of the environment that our want

of foresight makes us pay for over and over again in its endless manufacture of the degenerate.

There are many people who hold the most extreme views on heredity in connection with crime, etc., their evidence resting on similar ground to that of the Voit standard and Physiology's official explanation of mastication and swallowing, that is to say, on evidence founded on experiments on the lower animals (if not entirely so in the former, at any rate in the latter instance). It is not to be wondered at that the medical officers of hospitals should hold gloomy and pessimistic views on social questions. They are engaged in seeing an endless series of the diseased and degenerated coming to the hospital, from surroundings of which they have no real knowledge, nor, as we have seen, of their antecedents. They are so much in contact with disease during the whole of their active lives that they must almost necessarily look on it as inevitable and its causes beyond any possibility of remedy.

The only people in England who are concerned with active and practical regeneration are those in the Salvation Army, and in the Church Army, where one finds hopefulness and confidence; and where, though their efforts are without science, they are wonderfully successful. Science should study the questions of the transmission of such acquired characteristics as crime, etc., at Dr. Barnardo's Homes. He does not find in practical experience that it is necessary to reject children with a bad pedigree, he does not find it necessary to inquire about it, yet the children he takes are those who are abandoned by their parents, who are derived from those classes about whom we are so disturbed. No one would wish to question that there are such lamentable occurrences as hereditary mental disease, in rare cases ineradicable hereditary crime and drink, also that there is a vast amount of hereditary tendency to degeneration. But it is necessary to realise that here is actually an experiment where, with altered environ-

ment, this unpromising material was able to provide no less than some twenty thousand who have emigrated to Canada, and of whom it is said that no less than ninety-eight per cent have turned out well. This surely shows that there are far more urgent questions than the sterilisation of the unfit. How often will it be necessary to point out that to draw conclusions from the study of guinea-pigs, pigeons, chickens, etc., and apply them to human beings is not only inaccurate and misleading, but unscientific in the highest degree? Human beings must be continually studied in human surroundings by competent scientific observers; unfortunately there is certainly no lack of material from which to establish definite principles.

As previously mentioned there are few people who have rendered such great services to humanity as Mr. Z. R. Brockway in his experiment of the substitution of reformation for the punishment of crime. The following quotations from one of his

reports will serve to show that he did not nurture any undue tenderness or blinded prejudice in the favour of criminals. The personal observation of some fifty thousand criminals enabled him to write the following: "They belong to the grade of humanity which is inferior. The whole inmate population may be divided into two grades of inferiority, — those whose defectiveness is very apparent, and others whose mental and moral defects are concealed under good (and sometimes quite brilliant) capabilities in given directions. About one half of them have not been unfamiliar with life in institutions of one kind or another, with arrests and imprisonments, temporary or prolonged, in station house, jail, or prisons for juvenile offenders or misdemeanants; while some of them had been imprisoned for serious crimes. More than sixty per cent of them are practically illiterate on admission to the reformatory, and at least one third of the whole are from a class of dull scholars in the public primary schools, or

truants who burrow in lanes and alleys, where they form the worst associations and personal habits. They are without the ordinary amount of imagination, and without the common ambition of the non-criminal of their class of society. As a whole the prisoners are indolent, unstable, reckless, and unable to compete with normal workers, and perhaps they are as unable as they are indisposed to contend with the temptations of vice and crime. Many of them are dishonest, dishonourable, merciless, and base. They are of a class naturally, and it may be inevitably, criminal." The work at the remarkable institution of Elmira was carried on without the resources and interest which so important an experiment should have commanded. In spite of all this, its success was extraordinary, in that out of no less than ten thousand, at least ninety per cent of such unpromising material as would have made most men despair were returned to society as useful citizens.

Many other experiments besides those

of General Booth in the Social Wing of the Salvation Army could be quoted to tell the same tale, that any efforts made practically and continuously to effect regeneration have nearly all been followed by conspicuous success, conspicuous failure existing mainly in our dangerous imaginations.

In the case of disease, scientific men have acquired positive knowledge in the application of science to its treatment, and so ought science to be used in the treatment of social ills and diseases. The medical profession has, as we have seen, devoted itself, up to the present, mostly to the acute deviations from health. Crime, pauperism, thriftlessness, intemperance, etc., are instances of aberrant instincts, or the symptoms of those chronic deviations from optimum health in the uneducated and in those who have become degenerated from environment. Brockway, Barnardo, Kellogg, and General Booth stand for environment against heredity.

In the bewildering complexity of these

human phenomena, measurement, which is science, alone will bring progress and order where now none exist. If we were able to measure man's deviation from his optimum health, we should then know what it costs in efficiency and human value to live in a slum, and the effect on the physical and mental machinery estimated in black and white. Science is the only true charity and the only true remedy.

Are not the phenomena that so disturb us the effects of environment? The association of crime areas and bad environment is surely not accidental. Would it not be as certainly possible to produce a criminal in the surroundings of the "submerged tenth" as it was for Barnardo to make a self-respecting and self-supporting citizen from their children? "Environment makes the man" ought to be written large in every school; it ought to be burnt into the brains of law-makers and judges. How does environment make the man? What is the cost of foul air? of bad food, of bad feeding? Why is this man degenerated? why

is the next one diseased and his brother a lunatic? Why is it that some parents have idiotic offspring? If they knew their condition, if enough was known to predict with scientific certainty that the disastrous event would have occurred, the parents might have been saved from degeneration, and would not, in their ignorance, have committed the supreme crime of bringing such offspring into the world. No; the fact is written everywhere, that at no time in the world has there been a concerted attempt to discover man's aptitudes and capabilities and to make full use of them.

If it is conceded that a case has been made out for the necessity for the acquisition and distribution of the science of humaniculture, it will be seen that it is to the direct and indirect interest of every citizen that it should be carried out as soon as possible. A matter that is the concern of every citizen is clearly the business of the State, who alone can undertake so vast a task. The first duty

of a department of humaniculture in government would be the acquisition of knowledge by the classification of that which is already available, and the active prosecution of scientific research. As soon as it was clearly advisable it would be necessary to create the apparatus for the distribution of suitable and reliable information. These duties would slowly become administrative as knowledge and experience was gained. The necessary practice could be obtained by the establishment of experimental prisons, reformatories, workhouses, and institutions for paupers, drunkards, etc., with labour colonies, where observation and experimental research and the education of prison and other State officers could be carried out. The work could only be done by trained observers and practitioners of the medical sciences. The distribution of knowledge could be secured by the establishment of subsidiary provincial and municipal centres that would ultimately supply officers for the

administration of the institutions which come under the scope of regeneration and humaniculture. The department would grow slowly and surely, its actions should be extended with the greatest care, and only extended when it was clear that efficient men were trained for the new duties. Nothing would form so harmful and retrograde an influence as a tendency to undertake duties for which there was more enthusiasm than administrative capability and experience. It would be advisable that the most generous provision be made for the reward and payment for private research.

The great duty of the department would necessarily be that of education. It would be advisable to appoint medical officers for regular inspection of the schools, so that defects of sight and hearing could be detected, and early symptoms of infective and contagious disease. The general condition of the children could be noted, and such measures taken that were thought to be advisable. The medi-

cal officer could take charge of education in humaniculture with physical exercises. One of the first duties of the central department would be to ascertain with the least possible delay the elementary or necessary information that should be imparted to children in schools: (1) On human and general Anatomy; (2) On human Physiology; (3) On Psychology; so that they would be enabled to avoid the unfavourable factors of degeneration, and make as much use as possible of the favourable factors. In this way alone could Huxley's conception of education be carried out: "Education is the instruction of the intellect in the laws of nature; under which name are included not merely things and their forces but men and their ways, and the fashioning of the affections and the will into an earnest and loving desire to move in harmony with those laws. For me education means neither more nor less than this. Anything that professes to call itself education must be laid by this standard; and if it fail to

stand the test I will not call it education, whatever may be the force of the authority or numbers on the other side."

No nation is so fitted to carry out the work of humaniculture for itself and Humanity as is the United States. The country has shown itself pre-eminently capable in *production*, the science of "doing things." It is free from the entangling customs of the past that clog the wheels of progress in Europe. It most nearly realises Spencer's ideal: "The intellectual progress of a people or of an individual is by nothing so clearly measured as by the hold they have on the principle of causation." The enormous and varied annual emigration makes the problem of humaniculture peculiarly urgent. The material progress of the United States has been largely made by men who have shown the greatest readiness to "scrap" old notions and try new and better methods. The success of the United States Department of Agriculture and its widespread usefulness is a fine example

of what can be done on such lines. It has more money to spare than European countries. It has been estimated that the United States spends no less than six hundred million dollars annually on dealing with crime. If this enormous sum, together with that expended in other ways on disease, began to be diminished, it would provide more and more funds for the extension of humaniculture. May the crowning achievement of the most progressive country be that of leading the way to a civilisation that will surpass that of Greece as much as the present age surpasses it in the solid progress of the sciences and their application!

CHAPTER XIII

CONCLUSION

It has been shown that the medical sciences arose in consequence of the urgent need of the sick. The growth of the organisation affords an instructive illustration of co-operative evolution in the discovery and the application of knowledge. The commencement was in consequence of pre-eminent success in practice by individuals, and above all in their ability to explain the reasons for their success. Such a man was Hippocrates, who would have gathered a number of pupils round him and thus established a school of thought and practice. These old pioneers comprised in themselves all the varied special activities that now occupy the exclusive attention of highly trained and efficient specialists. In these days there are researchers and teachers in laboratories

who deal more with general than practical science. Many times in history successful practice has been for long periods ahead of scientific explanation. The pioneer work is, as we have seen, carried out in hospitals. The end of the whole system is in the faculty that the ordinary citizen possesses of having this science brought to his doors by the general practitioner, in whose hands the banner of progress will be worthily held in the more intimate work that regeneration and humaniculture will entail. It is clear that it would be inconceivable for the complicated sciences concerned in disease to be distributed to the general population, so that there is no prospect that disease experts with their present aims and experience can become health educators.

It is only natural that the opinions of those who are engaged in the practice of the medical sciences in laboratories and hospitals should hold views that are largely influenced by their habitual occupation. For instance, it would not be

unfair to describe Professor Metchnikoff's view of human nature as being microbic, and that of the "eminent physicians" who, Mr. Arnold White tells us, are in the state of "deeply appreciating" the truth of his views, to be seeing their fellow creatures through hospital spectacles. The only reason in alluding once more to these views is to recollect that they tend to retard the realisation of such applications of knowledge as humaniculture.

The great and inestimable value of the medical sciences to humanity is not only that it has diminished the horrors and dangers of disease by prevention and cure, but, above all, that there has been accumulated a magnificent capital of positive science. In the story of Mr. Fletcher the attitude of the medical profession towards his discovery can be said to illustrate two important facts:

(1) That there was a want of orientation towards the ideals of regeneration and humaniculture, because they had not discovered the facts themselves. Another

point that was brought out was the inability to measure the degree of health and fitness of an individual. It has been pointed out that where there is no measurement there is no, or at any rate little, science of the improvement of man.

(2) On the other hand, the immense value of positive knowledge is shown by the fact that unless there had been the work of Pasteur, so ably followed by Metchnikoff, Koch, and the rest of the army of bacteriologists, we should not have known how important it was to diminish the putrescence in the intestinal canal which was looked on as inevitable and natural. From this source comes, too, the scientific demonstration how it is that the body protects itself against microbes, and that this protection is proportionate to the health of the individual. Without the patient, unceasing labours of those practising the medical sciences there would not have been the growing conviction so ably voiced by Bouchard and his school, Mott and many others, that the

root-cause of disease consisted in auto-toxæmia or self-poisoning from an unscientific adaptation to life. Without the knowledge and organisation of the medical sciences, there would have been little to distinguish Mr. Fletcher's discovery from the numbers of fads, etc., that trouble us from time to time.

Looking out on the world phenomena generally one finds that the other manifestations of activity are, broadly speaking, similar to those of the medical sciences in that they are concerned with the satisfaction of man's most immediate needs. After all, one must recollect that a man who is cold gets himself clothes, a shelter, and a fire before he turns to the need in the next order of importance; in the same way the world's activities, that are the expression of men's needs, have been devoted to the means of supplying the most urgent of them in an economical manner, so as to save labour as much as possible. The material progress is by nothing so well shown as by the evolution of a rail-

way. It resembles a living organism; it has almost endowed itself with a nervous system, with so delicate a mechanism that now one brain can control its activities, where many were previously necessary with their divided counsels. So in other directions where it is a question of winning or researching and of distributing or applying material or science, the woods have been cleared, and the roads laid for those who follow to walk over. Life is easier, means of communication are growing and extending, news and thoughts are distributed from one end of the world to the other faster than the world moves round the sun. The world is triumphantly winning its battle over material nature; the fight is no longer so eager and hurried, the worst has been left behind. Now there is a pause with more leisure, the cost is being counted, the lists of the killed and wounded are being scanned. There is the same anxiety that France had after Napoleon, when she asked herself where were the bravest, the strongest of

her sons who should have bred and trained the future generation to be stronger and more glorious than the last? Every country is now asking itself what is the good of the wonderful and magnificent facilities of life if man, the lord of creation, is to become a miserable degenerate? They see that the saving of effort is being too dearly paid for, if the next generation is to include countless unemployable inefficients, degenerates, and criminals. And thus free rein is given to gloomy imaginings, all sorts and descriptions of views are current, men eagerly discuss Utopias that are only to consist of men like themselves; no degenerates are to be admitted; remedies are being eagerly discussed. The world, in short, is pausing, and thinking uneasily in its leisure before it turns once more to this new task that presents itself, so that it can work with refreshed energies towards the final and unending task, the perfection of man, which is humaniculture.

Humaniculture is the foremost of the

arts, for it realises not only the perfections, but the perfectibility, of man. These ideals made gods of men and men of gods in the Grecian mythology. It united all that was great and noble in the nation to the one glorious aim of human perfection. Their reward was great; it has left behind a record of art that ennobled artist and subject alike, and a literature that has ennobled mankind. Such a level can never be attained except through the adoption of a similar national movement. The literature of Greece has been clung to with the strongest and the most instinctive persistency by the best minds in modern times. Its lessons can be said to be intimately mixed up with the foundations of all that is great and abiding in our civilisation. The mighty hold of classical ideals on the older universities, with their conceptions of physical education, is no accident: its explanation must be found in the conviction that they are instinctively holding on to truth, and that posterity will justify them. One great lesson that

is taught is, that a noble civilisation has a feeble grasp on life where its practice is not founded on positive science, however grand and abiding the utterances of their philosophers may be.

Old Hippocrates said that "it was only by medicine that one can arrive at some knowledge of human nature, — but on one condition, to embrace it in its true generality."

Humboldt, too, tells us that "the final goal of man, that is to say, the goal that is imposed on him by the eternal and unbreakable exigencies of reason, . . . consists in, as far as possible, the harmonious development of all his qualities in a complete and united whole."

Seidleitz says, "that moral and rational life consists in the carrying out of all the functions of the body to a satisfactory and proportionate degree."

Bacon predicted a great future for medicine in its applications to the progress of hygiene, in civilisation and social betterment, in the physique and mind of man.

The abiding impulse of the human spirit is towards perfection. The mission of the social teacher is to make this impulse both conscious and positive. There have been many panaceas, many definitions of what the Greeks called "the sovereign good" for humanity. It has been said that in the time of Grecian civilisation, when such matters were clearly interesting, there were no less than two hundred and eighty-eight counted. Heraclites, Socrates, Plato, and even Aristotle, and many others, were continually using their minds for the purpose of subtle word-spinning, for the manufacture of fine theories of magnificent proportions resting on the slenderest of foundations. When Aristotle said that the greatest knowledge was the least useful, the practical Epicurus denied it flatly, and protested that the only way to judge knowledge was to know to what extent it contributed to man's happiness. He brought those wonderful and haughty intellects down to earth, down to the every-day commonplaces. His final definition

of philosophy was that it is not a pure and theoretical science: it is a practical law of action; even more, it is itself an action, an energy that obtains by speech and reason a happy life. We want an Epicurus in these days to bring us down to earth; the great social phenomena that confuse us by their magnitude, whether it be in their magnificence and grandeur or in their horror and misery, — are they after all anything more than the phenomena of the actions of one mind multiplied by thousands or millions? We do not know ourselves. The greatest "sovereign good," to use the phrase of the old Greeks, is first to know ourselves, our Anatomy and Physiology, our capabilities and aptitudes, and then, with all the resources of the experienced Old World, to cultivate ourselves. Our old Mother Earth will no longer have to listen to the hoarse discordant cry of the weak and degenerate, battling with death. May she be gladdened with the harmonious song of her sons rejoicing in their common heri-

tage of all that is good and great in nature,—a heritage made glorious through Humaniculture, the golden science of perfect man, the last "sovereign good" of all!

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